

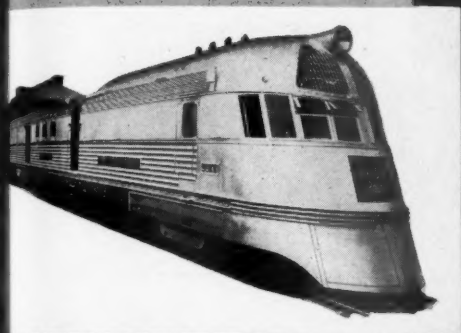
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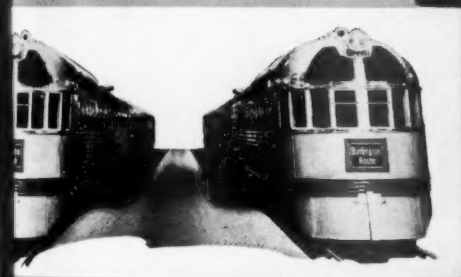
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Railway Age

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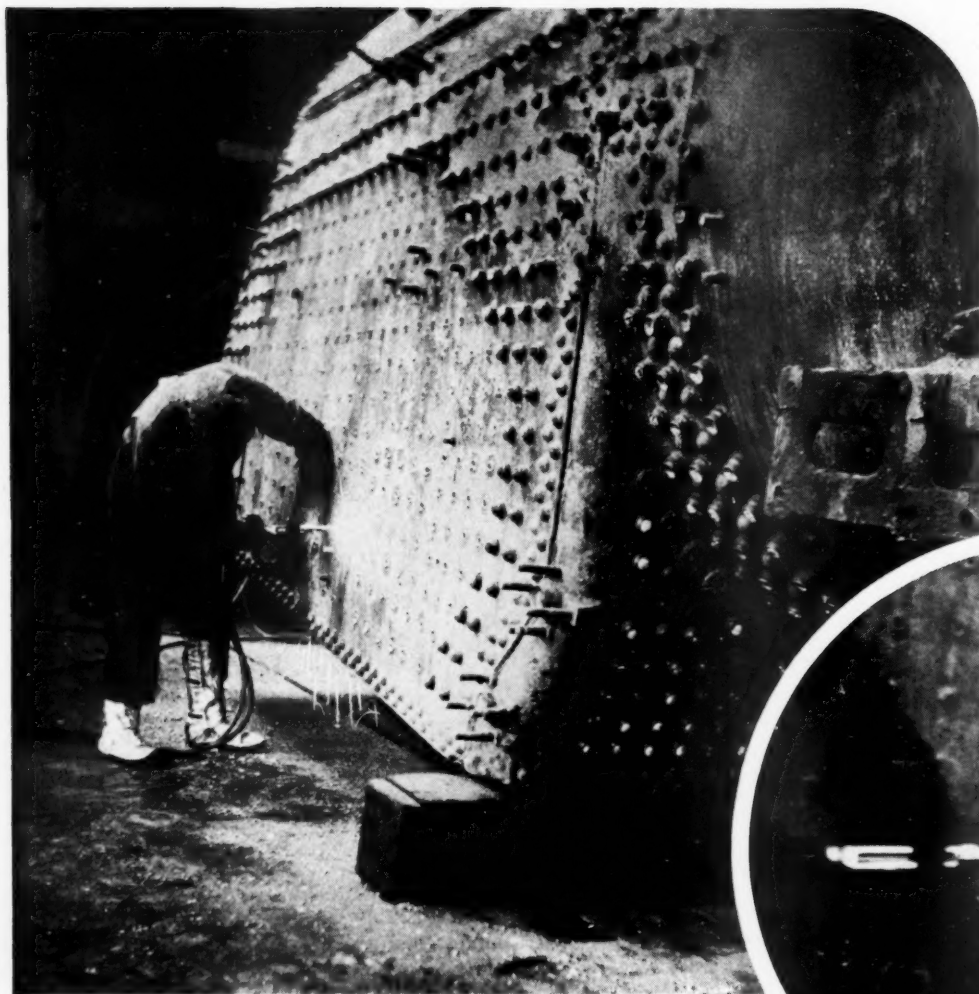


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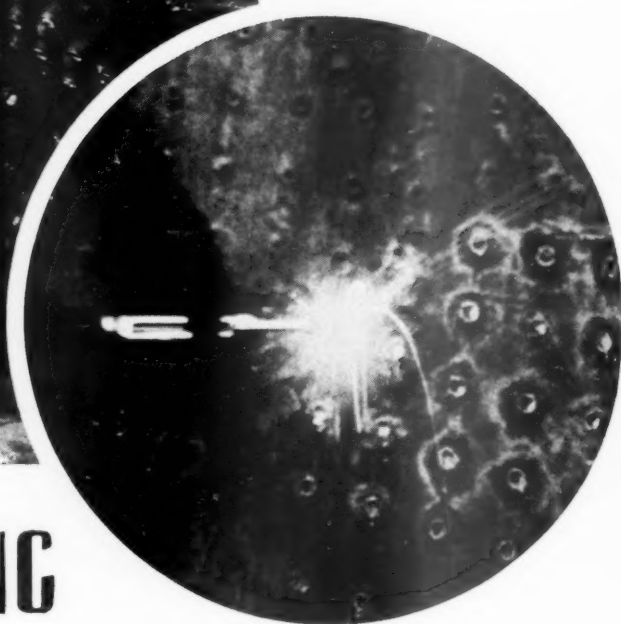
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October 26, 1935

No. 17

In This Issue

Why the Diesel Is a Good Railroad Tool.....Page 522

A. H. Candee, Diesel-electric engineer, Westinghouse Electric & Manufacturing
Company, discusses the engineering facts and economics involved in the use of
Diesel power in rail transportation service.

Interlockings Consolidated at Houston, Tex..... 533

W. A. Stahl, assistant engineer, signals, Missouri Pacific Lines, tells how that
road and the Southern Pacific have joined in an extensive program designed
to facilitate train operations by concentrating control at fewer points.

Motor Carrier Act Will Bring Big Changes in I. C. C..... 545

A Motor Transport Section article by F. J. Lisman, who predicts that the
personnel of the regulatory body will be more than doubled and that the rate
basis will be changed, with classifications simplified.

EDITORIAL

Old Deal or New Deal—Which Is the Worse?..... 519

GENERAL ARTICLES

Why the Diesel Engine Is a Good Railroad Tool..... 522
Regulators Discuss Motor Carrier Act at Annual Convention..... 528
Associated Traffic Clubs Meet at Indianapolis..... 531
Interlockings Consolidated at Houston, Tex., by W. A. Stahl..... 533
Safety Conference Held at Louisville..... 535
Freight Car Loading at New Peak..... 538
Bridge and Building Association Holds Successful Meeting, Part I..... 539
New Haven Files Under Bankruptcy Act..... 542

MOTOR TRANSPORT SECTION

Getting the Most Out of Buses..... 543
I. C. C. Begins Motor Carrier Regulation..... 544
Motor Carrier Act Will Bring Big Changes in I. C. C., by F. J. Lisman..... 545
What the Santa Fe Bought..... 547
Bus Operators Meet..... 547
Burlington Enters Truck Field..... 548
What to Do with Truck Rates..... 548
Commission Issues Motor Transport Forms..... 548

NEWS 550

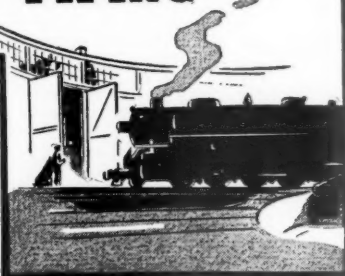
FREIGHT OPERATING STATISTICS..... 559

The Railway Age is indexed by the Industrial Arts Index and also by the
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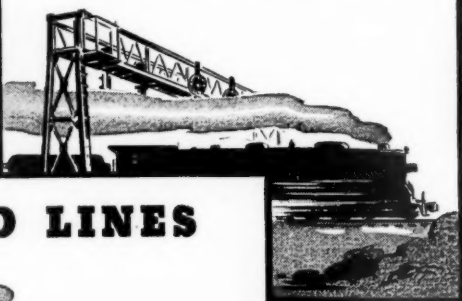
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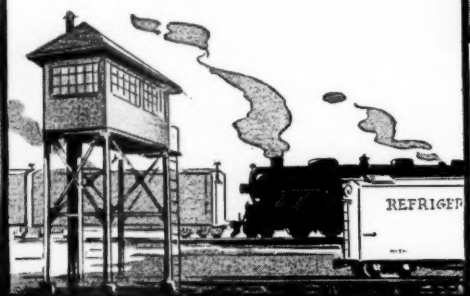
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RAILWAY AGE

Old Deal or New Deal— Which Is the Worse?

The great war between the Old Dealers and the New Dealers is on. Because most of the former are Republicans and most of the latter are Democrats, it is largely political. But the real issues are economic. The *Railway Age*, the railways and their employees, and manufacturers for railways and their employees, can thus far regard the struggle with some detachment and impartiality because they have reason to fear both sides almost equally.

The railways are slowly bleeding to death because they have been, and still are being, victimized by both Old Deal and New Deal policies. Owing to their condition those directly and indirectly dependent upon them for business and employment are suffering severely.

Meantime spokesmen of the Old Dealers, whether business or political, offer no solution of the railroad problem. When they mention it—which is seldom—it is usually to disparage railway managements and to defend and advocate for railways exactly the same government policies that they indignantly and clamorously oppose for other industries. In certain respects the attitude of the New Dealers is more favorable. They have hindered increase of production and traffic and increased railway operating expenses, but at least they do favor abolishing the unequal regulation of competing classes of carriers established under the Old Deal. Some of them advocate government ownership of railways. But that is no worse than most Old Dealers' practice of ostensibly opposing government ownership while defending and advocating government policies that tend more effectively, by undermining railway earning power, to bring about government ownership than its frank advocacy.

What Do Old Dealers Actually Favor?

As we review the history of the last quarter century, and observe current developments, we wonder whether the capitalistic system in the United States is in more danger of being murdered or of committing suicide. The Brookings Institution, Washington, D. C., has published four volumes which constitute probably the most comprehensive and valuable study of the functioning of capitalism, as it has been affected by both government and business policies, that ever has been made. They are the result of collaboration by a group of able

economic specialists under the direction of Dr. Harold G. Moulton, president of the Institution, and are entitled, "America's Capacity to Produce," "America's Capacity to Consume," "Formation of Capital," and "Income and Economic Progress."

Their detailed factual presentation is a vindication from the attacks of the socialistic-New Deal economists, of the old-fashioned "classical" or orthodox economics upon which American political and economic institutions were based. But it is far from being a vindication of the Old Deal government and business policies that prevailed in this country before the New Deal. And it is highly desirable to recognize now and in future that, while the New Deal has protracted the depression, it was under and because of the Old Deal that it began and became most severe, and that the worst New Deal policies have been derived from some important Old Deal policies. The Old Deal must have been pretty bad to have caused such a debacle. What, then, have the Old Dealers of politics and business to offer in place of the New Deal? Merely a return to the policies that caused, or did not prevent, the debacle? We do not know, although we hear and read much of what they say. It consists almost entirely of criticisms of the New Deal. The natural inference is that they merely want to restore the Old Deal, politically and economically. Obviously, restoration of a Deal that caused present problems would not solve them.

Brookings Institution on the Depression

What, then, was the matter with the Old Deal? Our interpretation of the data, reasoning and conclusions of the Brookings Institution is that the trouble was not with the basis or accepted principles of capitalism, but was that the system was prevented by Old Deal government and business policies from functioning in accordance with its own economic principles. Most New Deal theories regarding causes and remedies of depressions are rejected. There was not over-expansion of the total plant of industry, although, significantly enough, it is emphasized that there was great over-expansion of transportation facilities. There was no general over-production of goods and services. (In fact, as shown by the tonnage of commodities carried by rail, the increases of facilities of production, and of the production of consumable goods, were relatively much

smaller during the 'Twenties than during the two preceding decades. The average annual increase of railroad tonnage from 1920-1929 was only 30 per cent as large as between 1910 and 1920, and less than 23 per cent as large as between 1900 and 1910.) The total value of all goods and services produced in 1929 was only \$665 per capita. Over 19,000,000 families, or 71 per cent of the total, had incomes less than \$2,500. Therefore, the public welfare even then demanded, and now more imperatively demands, a huge increase in production of all kinds of commodities, including agricultural, and the vastly increased investment of capital, and the full employment of labor at much more than 30 hours a week, necessary to secure a huge increase in production.

The depression was caused principally by maldistribution of income. The principal maldistribution was between farm and non-farm families. In 1929 the average income of 5,800,000 farm families was only \$1,240, as compared with \$3,226 for 21,674,000 non-farm families. The disparity in income was caused principally by government and business policies affecting wages and prices.

Why Capitalism Did Not Work

The economics of capitalism, as the Brookings Institution emphasizes, assume free competition by all naturally non-monopolistic industries and free operation of the law of supply and demand. They assume that increased efficiency in industry will result, and will cause reductions of production costs the benefits of which will be distributed among all members of society through reductions of prices. Organized business and organized labor prevented reductions of industrial prices during the 'Twenties proportionate to increases in efficiency of industrial production. Consequently, instead of industrial prices declining, industrial wages and profits increased. About fifty-four millions of people living on farms and in adjoining small towns, who would have benefited by reductions of prices, did not benefit by the advances in wages due directly and indirectly to the effective pressure of organized labor. Also, some twenty millions of small shopkeepers, tradesmen, and other urban groups fall outside the wage system.

"The wage increase method of disseminating the benefits of technological progress," says the Brookings Institution, "would, therefore, not extend to more than 40 per cent of the population." Industry did not expand its plant and production as much as its profits would have enabled it to, because the maldistribution of income prevented a sufficient increase of buying by the 60 per cent of the population not benefited by wage advances. The profits and other income available for investment in additional facilities of production, but not invested in them, went into the securities market and bid up to ridiculous prices the bonds and stocks available for purchase. The profits of industry being insufficient to justify and support the resulting vastly inflated security prices, the stock market broke, causing

loss of a large part of the investment made in securities at inflated prices, destroying purchasing power and business confidence—and the depression began.

Railroads Under Old Deal Economics

Where do the railways appear in this story of Old Deal economic policies and their effects? They had to pay the prices fixed by industry and its labor. In government arbitrations their wages were compared with those in other industries, and made even higher. Their rates were based by the Interstate Commerce Commission on the resulting high operating costs and a "fair return on fair value"—which return they never got even in the most prosperous years. Then business as well as agriculture complained that their rates were too high, and joined in promoting competition with them through government use of the taxpayers' money. Organized business and agriculture, by political pressure, caused and are still causing vastly increased expenditures on inland waterways. They caused—and are still causing—huge expenditures upon highways to accommodate commercial carriers.

"The collapse of political morality in government did not begin with Teapot Dome or the black satchels of Republican days", says David Lawrence, an able journalist who has been an observer of developments in Washington for many years, in his recent book "Stumbling Into Socialism". "It began the moment the 'pork barrel' idea was advanced in Congress. It began when the thoughtless citizens in the local chambers of commerce sent their delegates to Washington to beg for appropriations to build unneeded bridges and dams or to deepen harbors or waterways long since abandoned as contributing to a national transportation system."

Harper Sibley, president of the Chamber of Commerce of the United States, made a very significant statement in a recent address to the Chicago Association of Commerce. This was, that numerous local Chambers of Commerce would refuse to vote in the U. S. Chamber's current referendum regarding New Deal policies because of fear that they would thereby prevent their communities from getting New Deal—or Old Deal—government money for local projects! Republican Old Deal politicians inveigh against excessive New Deal spending—but, for their own political purposes, favor immediate payment of the soldiers' bonus!

New Dealers Steal Old Dealers' Clothes

The New Dealers found the Old Dealers in swimming and stole their clothes. They derived their program of vast government expenditures upon public works, many of them in competition with private industry, from the Old Dealers of politics and business who originally promoted, and still promote, vast expenditures on highways and waterways to increase competition with the railways. Their success in getting federal government "aid" for highway construction has greatly stimulated the bankrupting expenditures made by the states to provide expensive highways for commercial transportation. Meantime, the Old Dealers effectively

opposed regulation of water and highway carriers such as that applied to the railways in order that they might selfishly benefit by rates and discriminations that the railways could not make. Consequently the railways entered the depression suffering already from excessive operating costs and losses of traffic; and their continuance plus the depression has reduced the railways and industries dependent upon them for a market to their present disastrous plight.

New Dealers and Old Dealers Collaborate— to Restrict Production

The Old Deal caused the depression. It also helped to deepen and protract it. A creditor nation cannot long restrict its imports without also restricting its exports. In 1930, when larger exportation of agricultural products was vitally needed, the Old Deal raised the tariffs to curtail imports, with the inevitable effect of curtailing export of farm products and aggravating the already extremely difficult and vital problem presented by farm surpluses and reduced farm purchasing power.

The New Deal adopted a policy of subsidizing farmers to reduce production in order to increase their prices. Then, in total disregard of all economic conditions and principles, the New Deal and Old Deal business and organized labor, joined under NRA in advancing industrial wages, production costs and prices, which plainly tended to nullify the efforts to increase farm purchasing power. AAA and NRA together constituted a policy of putting all prices of American products on stilts, with the inevitable result of restricting all domestic and foreign markets for our products and thereby of restricting all production. The railways and industries dependent upon them for a market have suffered because of the consequent restrictions of traffic, increases of railway operating costs and reduction of net operating income.

Business Again Improving—In Spite of Both New Deal and Old Deal

Business is again improving in spite of both the Old Dealers and the New Dealers. It has been stimulated

by the effects of the Supreme Court's decision destroying NRA. The railroads are benefiting by the improvement. Their car loadings in the first two weeks of October were 38 per cent larger than when they reached the lowest level of this year in the first two weeks of July—the largest increase that has occurred within the same period since the depression began. But their traffic and expenses are still being adversely affected by both New Deal and Old Deal policies.

We know the economic philosophy of the New Deal. It is a socialistic philosophy which aims at the redistribution of wealth and income in the supposed interest of the poorer classes, but the actual policies of which tend to curtail all production and thereby prevent the increase of national income much more essential to the welfare of the 71 per cent of American families that had incomes less than \$2,500 in 1929 than to the welfare of the much smaller number who had larger incomes. But what are the economic philosophy and policies of the Old Dealers? What, especially, are their economic philosophy and policies regarding transportation and its employees and the industries and their employees that are dependent upon transport agencies for a market and for employment?

The *Railway Age* always has been outspokenly opposed to the New Deal, but it is almost equally opposed to the Old Deal if the policies favored by its political and business spokesmen are the same as those of the Old Deal which caused the depression and have helped virtually to ruin the railroad industry and industries dependent upon it for a market. In the front ranks of the loudest critics and opponents of the New Deal are many politicians and business men who, with absolute inconsistency, plainly dictated by the grossest selfishness, have favored, and still favor, for the railroads exactly the same government policies that they now oppose for other industries. There are many who do not now know, but would like to know, what are the real economics of these persons—whether they actually are opposed to socialistic policies or not—in order to help them make up their minds whether the economics and policies of the Old Dealers or of the New Dealers are really the worse.

A Governor Who Understands the Economics of Transportation

Sound co-ordination means a process which would result in each means of transportation handling that traffic which it can handle at the lowest cost, with due allowance for differences in the quality of the different kinds of transportation service rendered. So-called "co-ordination" might exist under a policy or system which resulted in traffic being divided between means of transportation entirely regardless of the cost and quality of their different kinds of service, but it is obvious that such so-called co-ordination would be entirely unsound economically, and therefore contrary to the best interests of the general public.

That a means of transportation which is strictly regulated and is not subsidized loses traffic to a means of transportation which is not comparably regulated and is subsidized, is certainly no evidence of the superior economy and efficiency of the unregulated and subsidized means of transport-

tation. On the contrary, the fact that any means of transportation seeks subsidies and tries to avoid "comparable regulation" is very strong evidence that it does not believe it can withstand competition under government policies that treat all means of transportation alike.

It is not intended to underestimate the economic value of bus and truck operation, neither are the values of airline and waterway operation ignored, for it is fully appreciated that each one of these different types of transportation has its place in the general plan of transportation. The chief concern is the very evident demand for a program, not only of co-ordination, but also of equalization which will eventually bring about a situation where all types of transportation are operating upon a parity, one with the other, and are co-operating one with the other, from an economic standpoint.

—From an address by Governor Paul V. McNutt of Indiana, before the Associated Traffic Clubs of America.



Westinghouse 800-Hp., 115-Ton Double Power Plant Diesel-Electric Locomotive Pulling a Train on a Southern Road

Why the Diesel Engine Is a Good Railroad Tool

A presentation of the engineering facts and the economics involved in the use of Diesel power in rail transportation service

FRIDAY, October 18, was "Diesel Night" at the New York Railroad Club and those in attendance had an opportunity to learn the extent of the application of Diesel power to American railroads and to determine, from the engineering facts presented, where the real future of the Diesel engine in the rail transportation field will probably be. L. G. Coleman, vice-president, locomotive department, Ingersoll-Rand Company introduced A. H. Candee, Diesel-electric engineer, Westinghouse Electric & Manufacturing Company who presented a paper on the subject of "Why the Diesel Engine has Taken Its Place As An Economical Railroad Tool," an abstract of which is presented here. Prior to the presentation of Mr. Candee's paper J. P. Hyde, engineer, locomotive department, Ingersoll-Rand Company showed a number of slides of Ingersoll-Rand Diesel railroad applications and engines under construction.

Mr. Candee's Paper

Even though the use of conventional motor cars and locomotives with this same type of power had been growing and they had been performing satisfactorily since 1925, saving the railroads actual cash during the lean years of 1930 to 1933, the blare of publicity which accompanied the inauguration of Diesel-powered high-speed trains in 1933 definitely made the railroads Diesel-conscious and awakened our steam friends to the modern transportation trends. Visualizing these spectacular developments as being a real threat, immediate steps were taken to meet this new type of service by fitting

the exteriors of steam locomotives with skirts and ruffles to make them look modern and progressive, to prove that the words "speed" and "Diesel" were not synonymous. It was even claimed that the Diesel manufacturers, by making articulated trains, had seized control of the load that could be given to the Diesel in order to make this type of power successful. Nothing could be farther from the truth. The Diesel manufacturer was not the originator of the streamlined train—the railroads themselves applied progressive principles to the art of railroading and, in their attempt to modernize their trains, turned to the Diesel as being the most eco-

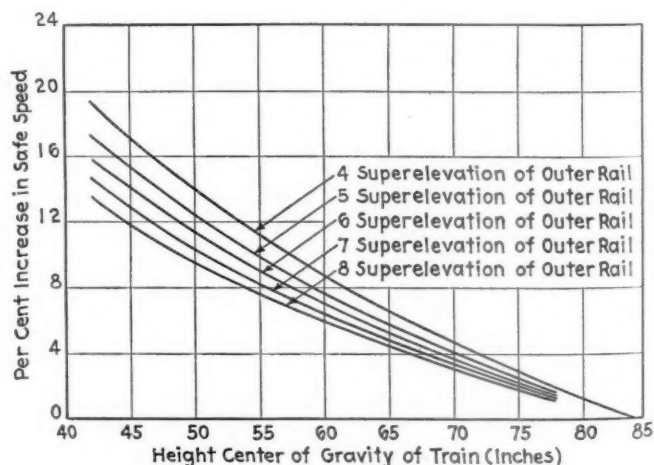


Fig. 1—Increase in Safe Speeds on Curves Due to Lowering of Center of Gravity Heights

nomical prime mover. Fortunately, with trains of light weight and aerodynamically designed exteriors, the power requirements fell within the range of Diesel engine developments.

As a matter of fact, the type of power used for fast schedules is of little importance so long as there is sufficient horsepower per ton of train weight to insure fast acceleration. A steam locomotive with light-weight trailers may make just as fast time as any Diesel locomotive or motor car, but it was this development by the railroads that made the steam designers conscious of modern trends in rail passenger transportation.

There are some definite reasons for being able to operate a Diesel unit train at higher speeds than steam. Among these are lower center of gravity and absence of unbalanced forces on the rail. Steam-hauled trailers have not ordinarily been articulated, while most of the unit trains have been of this construction, which enhances the riding characteristics of the train. Fig. 1 shows the permissible increase in "safe" speeds, with various heights of center of gravity, on any track curve with a given rail superelevation. As an example, reduction from the center of gravity height of a steam locomotive (84 in.) to that of a Diesel-powered unit train (48 in.) permits of a 15.2 per cent increase in speed around any curve having a superelevation of the outer rail of 4 in. or a 13.5 per cent increase with a 5-in. superelevation.

What Fast Schedules Mean

As an illustration of what may be done in the way of fast schedules, an analysis made recently of a high-speed run on a western railroad, showed that of the 400 miles operated between terminals 343.55 miles could be run at the maximum permissible speed of 90 m.p.h., while the other 56.45 miles had to be limited to speeds shown in Table I. In addition there were a number of slow downs and stops.

This run was calculated for two different sizes of equipment, the first with 100 per cent Diesel engine capacity, and the second with 137 per cent engine capacity. The 100 per cent engine capacity would operate the train at 92 m.p.h. on the equivalent grade with a 20-mile head wind, while the 137 per cent equipment would balance well above 100 m.p.h. under these same conditions. From a braking (1.5 m.p.h. per sec.) and accelerating curve for each equipment, such as Fig. 2

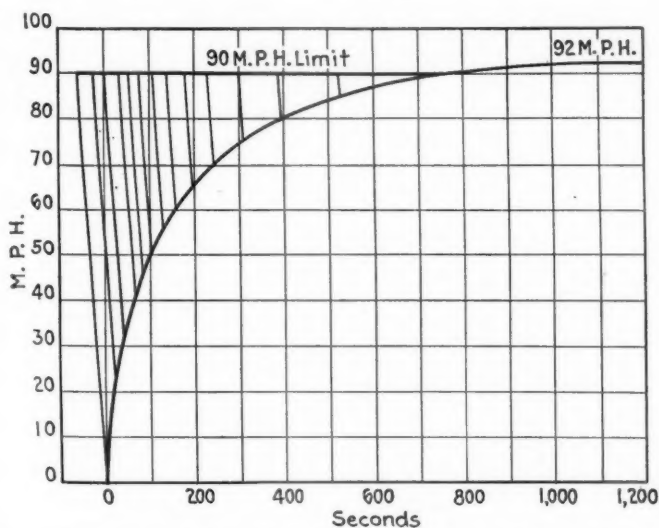


Fig. 2—Acceleration Characteristics of a 330-Ton Train on a .05 Per Cent Equivalent Grade with a 20 Mile Per Hour Head Wind—The Diesel-Electric Locomotive Develops 1,250 Hp. at the Drivers

for the 100 per cent equipment, we obtain the unit loss of time for these speed restrictions and slow downs. This is shown in Table II. Thus, by figuring the whole run at 90 m.p.h. and then adding the time lost for slow running and for slowdowns, we get the time for the runs as shown in Table III.

Now, suppose we were to boost the safe speeds on the 70, 75, and 80 m.p.h. zones (42.50 miles) to 90 m.p.h.,

Table I—Speed Restrictions and Slowdowns on a 400-Mile High-Speed Run

Miles	Speed, m.p.h.
32.75	80
1.75	75
8.00	70
7.50	60
2.65	40
1.50	30
1.15	25
1.00	20
.15	15
No. slowdowns from 90 m.p.h.	
6	80
8	75
5	70
2	60
6	50
1	45
5	40
1	30
3	25
1	20
1	15
7	0
6 intermediate stops of 2 min. each.	

we would save 4.80 minutes, whereas cutting out one slowdown to 20 m.p.h. and one to 15 m.p.h. would more than equal the boost in speed over this 42.5-mile section. This illustrates the fact that high speed is not necessarily the answer to fast schedules.

Shortening of schedule time, as the railroads are operated today, must be accomplished through a reduction of slow running zones, of stops, and of slowdowns, also by the use of more horsepower per ton of weight to get

Table II—Time Lost in Slowdowns and Speed Restrictions Below 90 M.P.H.

Slowdown to, and restoration from, m.p.h.	Time lost, min.	
	100 per cent power	137 per cent power
80	.27	.09
75	.47	.19
70	.68	.29
60	1.13	.56
50	1.47	.84
45	1.70	.96
40	1.87	1.07
30	2.15	1.32
25	2.35	1.47
20	2.50	1.59
15	2.65	1.70
0	3.00	1.97
Running at, m.p.h.	Either equipment (per mile)	
80	.09	
75	.14	
70	.20	
60	.34	
40	.84	
30	1.34	
25	1.74	
20	2.34	
15	3.34	

the train back to its maximum speed as quickly as possible after such speed restrictions. This increase in horsepower per ton may be accomplished in two ways—a large increase in power with existing rolling stock, or a reduction of train weight and resistance by the fabrication of new trains. It is this latter method that

has been selected by the railroads, resulting in the streamlined trains of today. The Diesel engine fits into this scheme perfectly, as a marked lowering of motive power weight may be effected thereby. The steam power of the Chicago, Milwaukee, St. Paul & Pacific new train, the "Hiawatha," weighs 268 tons with complete supplies of coal and water, whereas Diesel equipment, including the necessary increase in car body weight, train heating boiler, and full supplies weighs but 120 tons for the same service. The Diesel installation also lends itself to much better aerodynamic design, thus reducing train resistance appreciably. Taking the weight of the Hiawatha—locomotive and six-car train—at 600 tons, and the corresponding Diesel unit train at 330 tons and 1,250 rail horsepower, the steam locomotive must de-

economy and reduced repair expense, has superseded the gasoline engine as the preferable motive power. Such Diesel cars of conventional design have graduated from the branch-line class and are now used in mainline local service.

A typical example is a 125-ton car (weight with revenue load) owned and operated by the Boston & Maine, powered by a Westinghouse 950-hp. Diesel engine, and capable of hauling five or six trailers. The New Haven "Comet" has a Westinghouse 400-hp. engine at each end of the train, and may be operated in either direction at full speed, thus eliminating the necessity of turning the train at any time.

The conventional motor car, such as shown for the Boston & Maine, has a much wider field of applica-

Table III—Effect of Slowdowns and Power on Minimum Running Time of a High-Speed Schedule

Miles	Speed, m.p.h.	Running time, min.	
		100 per cent power	137 per cent power
400.00	90	267.00	267.00
32.75	80	*2.95	*2.95
1.75	75	.25	.25
8.00	70	1.60	1.60
7.50	60	2.55	2.55
2.65	40	2.23	2.23
1.50	30	2.01	2.01
1.15	25	2.00	2.00
1.00	20	2.34	2.34
.15	15	.38	.38
Stop time		12.00	12.00
Time unaffected by power		295.31	295.31
Slowdowns			
No.	to m.p.h.		
6	80	1.62	.54
8	75	3.76	1.52
5	70	3.40	1.45
2	60	2.26	1.12
6	50	8.83	5.04
1	45	1.70	.96
5	40	9.35	5.35
1	30	2.15	1.32
3	25	7.05	4.41
1	20	2.50	1.59
1	15	2.65	1.70
7	0	21.00	13.80
Total time of run		361.58	334.11
Time saving by 37 per cent power increase			27.47

* These and the figures following are the time in excess of that required to make the same distance at 90 m.p.h.

velop more than 2,300 horsepower at the rims of the driver to meet the Diesel schedule time.

A Definite Place for the Diesel in Road Service

The Diesel powered unit train has a very definite place in the American scheme of rail transportation, although no one with a knowledge of railroading expects such units to replace the common garden variety of locomotive-hauled trains, unless there is a radical change in operating methods.

While high speed modernistic trains have placed the Diesel engine in the spotlight, hundreds of such engines are performing daily in locomotives and conventional rail motor cars and are saving money for their owners. The gasoline rail motor car of 1925 to 1930 showed conclusively that there was considerable economy in the operation of branch lines by internal-combustion equipment and that reliability could be expected. Such operation developed a demand for higher and higher engine capacities to permit of expanding the utility of such cars. Naturally, the Diesel engine, because of its greater fuel

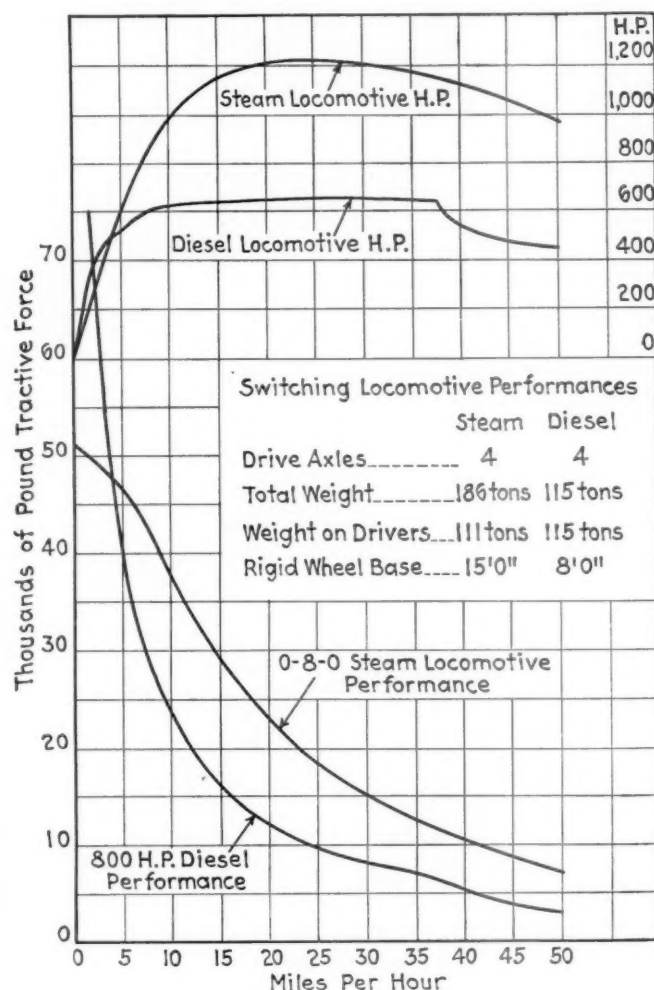


Fig. 3—Comparisons of Performance of Steam and Diesel Switching Locomotives

tion than the unit train. Built with standard draft gear and a steam heating boiler, it may be coupled to any standard passenger rolling stock, for use on branch lines or for main-line local or through trains. With light-weight trailers, it may be used for fast schedules, or it may haul more and heavier trailers at slower speeds. In this respect, it is just as versatile as a steam locomotive and costs less to operate. The weight saving of the motive power over the weight of steam power is also very marked, resulting in a reduction of over 200 tons in the total train weight. This factor alone permits of a considerable reduction in the required horsepower of such cars to duplicate steam service.

The saving in train weight effected by the substitution of a Diesel motor car for a steam locomotive is

easily understood. In the first place, the installation of the power plant in one of the revenue cars merely means increasing the car length by the amount necessary to house the equipment. The number of trucks is not increased, although the number of axles in one of the trucks may be increased. Heavier trucks are also required to support the additional weight of equipment and for mounting the traction motors. The total motor-car weight increase, therefore, is the additional car body and truck weight plus the motive power and train heating equipment and the fuel weights. Thus, if we take the loaded weight of the Boston & Maine baggage and mail motor car as 125 tons, and the loaded weight of a steam-

seen that the 4,500 lb. fuel capacity of the Diesel motor car replaces approximately 450,000 lb. of steam-locomotive coal and water, and since it is difficult to carry this on one tender, stops must be made to replenish these supplies.

The Diesel in Switching Service

While the conventional Diesel motor car shows large economies over steam operation, the Diesel switcher and transfer locomotive has a wider and more immediate field of application. There are in this country approximately 9,000 steam locomotives used for switching and light transfer work, many of which may be replaced by Diesel motive power, thereby effecting economies unequaled by any other existing type of power.

The first Diesel switchers in this country were applied in 1925 and were soon followed by others of larger capacities and weights. Today, their use has spread over the whole world. No other type of motive known has ever developed from its embryo stage to a full grown and proven product in such a short space of time—10 years. These locomotives may now be built in any desired capacity and may be applied with full assurance that they will perform efficiently and effectively.

It may be of interest to point out at this time that until around the year 1900, human beings had but one method of generating portable power in commercial quantities for transportation purposes. This was by steam. The commercial development of the internal-combustion engine subsequent to 1900, gave us a second method of generating portable power. The immense growth of the automotive industry speaks for itself as to the utility of mankind's second source of power.

The application of the Diesel engine to rail transportation results in somewhat different performance characteristics than those of its steam predecessor. Fundamentally, the steam locomotive has a rising power characteristic (due to the fact that the number of engine power strokes varies directly with speed), limited over the higher ranges of speed by its boiler capacity. The Diesel-electric locomotive, however, has a fairly constant horsepower characteristic, because the engine is not coupled directly to the driving wheels and may, therefore, develop its full speed and full power over the whole range of train speed. This characteristic is especially advantageous in switching service where frequent accelerations are a normal requisite of the type of service, and high speeds are not regularly attained. Thus, by making use of the better starting characteristics of electric motor drive and by utilizing full power for starting, a Diesel locomotive will out-perform a steam locomotive in this class of service, even though the steam locomotive may be rated at a considerably higher horsepower (at higher speed). Fig. 3 shows the speed-tractive force and the speed-horsepower characteristics of a steam locomotive developing a maximum of 1,220 hp. at the drivers and a Diesel locomotive developing 650 hp. at the drivers.

As indicated by Fig. 4, the performance of the Diesel surpasses that of the steam locomotive on short runs, such as are encountered in switching service. As the average length of run with a given load increases beyond those given on the curve, it requires more Diesel horsepower to duplicate the steam performance, so that in long freight runs (where the reduced weight of the Diesel motive power is a small percentage of the total train weight) the Diesel power must nearly equal that of the corresponding steam locomotive power. If the Diesel power exactly equals the maximum power of the steam unit, then on the ruling grade, or at other points where the train speed is reduced, the Diesel will develop

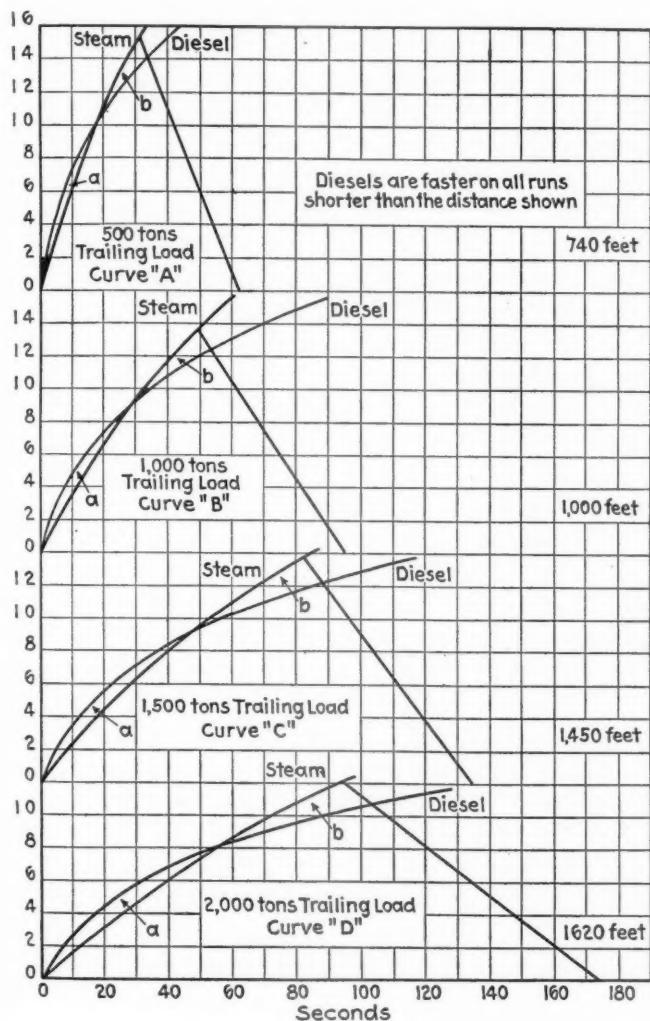


Fig. 4—Comparison of Switching Performance Between an 0-8-0 Steam Locomotive and an 800-Hp. Diesel-Electric Locomotive for Various Train Weights on Level Tangent Track—Relation of Time and Speed in M.P.H. During Acceleration and Braking Deceleration

hauled baggage and mail car of the same capacity at 60 tons, we arrive at a figure of 65 tons increase in train weight for the application of Diesel motive power equipment. The steam locomotive and tender used to haul this same train weights in the neighborhood of 275 tons, so that Diesel motive power shows a net saving in train weight of 210 tons. One Diesel train out of Boston last week weighed 513 tons total, whereas if this had been hauled by steam, the combined weight of train, locomotive and tender, would have been in the neighborhood of 725 tons, requiring at least 40 per cent more power if taken in the ratio of train weights. Since the weight ratio of fuel burned in the Diesel to coal and water used for steam motive power is about 1 to 100, it may be

more power than the steam, and the aggregate performance over the whole run will be better.

Speaking of performance, it is a peculiar fact that railroaders seldom see performance curves of their steam motive power. There are methods of calculating such curves, but in actual service the locomotives do not always meet these expectations, due to poor firing, dirty tubes and flues, mishandling of the cut-off, and other similar causes. On the other hand, if a steam locomotive is loaded to secure full performance at all times, the repair expense becomes excessive. In contrast with this, the true capabilities of the Diesel locomotive are easily calculated and may be utilized and maintained reasonably closely to the designed output without distress to any part of the locomotive. This is hard for the man who has been used to steam to understand, yet it is a fact and is easily measurable.

Diesel Operating Expense

There are many advantages in the operation of Diesel motive power, yet the principal consideration which has weight is operating expense. Unless the Diesel can save money over steam power, it has no great future. For the first five years Diesels were bought on an experimental basis, but now they are known to net large returns on the additional investment; the period of experimentation has passed. Improvements will undoubtedly be made from time to time, but this type of motive power as manufactured today meets the rigid requirements of railway service.

Because of the fact that economy is the underlying basis for the use of Diesel power, this factor has been attacked at every opportunity by proponents of steam locomotives who are not yet disposed to face the facts. The actual records of operation, however, have shown that the savings are real, the economies being largely effected by reduction of fuel, repair, crew, and engine-house expenses. Such reductions are not fictitious, but are proven by the actual records of railroads using Diesels. One of the most valuable compilations of Diesel switcher operating statistics to date was the 1932 report of the American Railway Association's Committee on Locomotive Construction, which gave operating results of a large number of such locomotives. A thorough analysis of these data, together with supplementary figures published by the American Electric Railway Association, gave some interesting facts. It was found that the locomotives naturally fell into two general groups—those built previous to 1928 (and which could be considered as being in the development stage) and those built subsequent to that date. While there were considerable variations, especially in repair expense of the experimental locomotives as compared to the later units, the averages showed:

1—Diesel fuel cost per hour per 100 tons on drivers is approximately 25 per cent of steam fuel cost with fuel oil at 5 cents per gallon and coal at \$3.00 per ton.

2—One gallon of Diesel fuel does as much switching work as 140 lb. of coal burned in a steam switcher.

3—Diesel engine lubrication is approximately 8.76 cents per hour per 100 tons of locomotive.

4—Locomotive lubrication is approximately 35 per cent of steam locomotive lubrication.

5—The total cost of fuel, engine lubrication, and locomotive lubrication, for the Diesel, is roughly 33 per cent of corresponding cost for steam.

6—A very definite Diesel locomotive repair expense trend curve, which is considerably lower than for steam power.

Data published subsequently by these committees showed still greater economies.

Fuel costs are definitely lower for Diesel power than for steam. To combat this argument, the steam pro-

ponents cast doubt as to the future supply of fuel. As early as 1908 it was predicted that our crude petroleum would not last over 10 years. The facts are, however, that the annual survey of known reserves for many years have indicated a 14 or 15-year supply at the current rate of consumption, with more oil being found each year. Geologists are probing to deeper levels where large supplies of oil are anticipated. Even assuming that no more oil is obtainable than the visible supply at present, it will take a very slight rise in price to develop the immense deposits of oil bearing shale, after which will come the derivation of cheap liquid fuels from coal and other hydrocarbon fuels from annual crops. It is hard to visualize civilization going back to the horse and buggy days, even though petroleum deposits were depleted. With the trend of today toward the use of the Diesel engine in buses, trucks, and the private automobile, it may be expected that the demands on our petroleum resources will be materially reduced in the future.

The Question of Repair Costs

The repair expense of Diesel motive power has been a somewhat vulnerable point which has borne the brunt of considerable criticism. As is true with any new development, there have been many cases where locomotive repair expense has been high, due to faulty initial design or lack of knowledge on the part of the operator, or from the desire to discredit this development. It is these examples which our steam friends hold up as samples. Taking the whole field, however, and averaging the results, shows a much better picture of the real repair costs which may be expected by the railroads. In the analysis of the data published in 1932, it was found that a definite repair trend curve could be anticipated. Deriving such a trend from those locomotives built prior to 1928 and from those subsequent to 1928, the two trends shown by Fig. 5 appeared. These curves include enginehouse expense also, as these two items could not readily be separated. The expected trend shown by the lower graph has been further substantiated by an analysis made by an executive of a road having actual operating experience with Diesel locomotives. By taking the known life, cost, and replacement labor of as many locomotive parts as possible, and by filling in the life expectancy of all other parts as determined from a wide study of various Diesel installations, the repair cost for each year of operation up to 25 years of age was determined. This resulted in a repair trend as shown by Fig. 6, the calculated curve being drawn on the curve derived from the association reports. These curves are both plotted on the basis of being the average

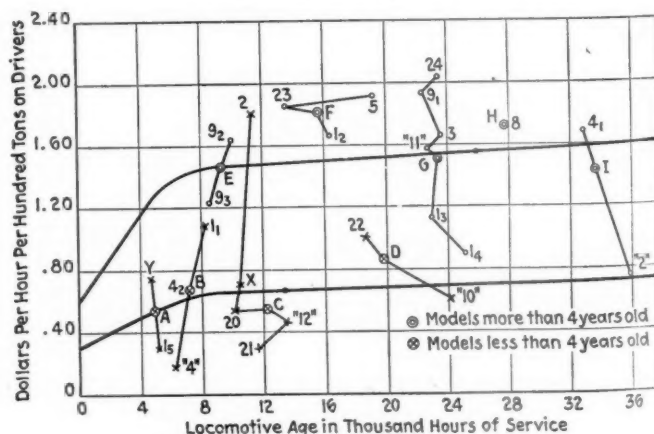


Fig. 5—Chart Showing Trends of Repair and Enginehouse Expenses for Diesel-Electric Locomotives of Various Ages of Service

cost of repairs per hour per 100 tons of locomotive weight up to the age of the locomotive.

You have all seen it proved "beyond a shadow of doubt by a study of records of tens of thousands of steam locomotives," that steam repair costs continue to rise with the age of the locomotive. The curves which have been published, however, have been drawn to show the repair cost for each year, whereas such curves would be more readily understood if they were drawn to show the average per hour up to the locomotive age. Fig. 7 shows a repair trend curve taken from published data which shows the rising trend of a steam switcher. The dotted curve is the same curve when reduced to give average or cumulative costs. These curves are plotted on the basis of age against dollars per horsepower unit. Now, if the steam locomotive is capable of developing 1,600 boiler horsepower and moves at the rate of six miles an hour (the rate used in figuring steam switcher trend curves), the horsepower units are 1,600 times 6, divided by 10,000, or .96 horsepower units. From Fig. 7 you may see that at the 25-year age of the locomotive, the average hourly steam repair expense has been $\$2.10 \times .96$, or $\$2.02$. From the Diesel trend curve, the repair expense has averaged less than $\$1.00$.

It is true that the Diesel repair trends cannot be established definitely, due to the extreme youth of this type of motive power. From experience with electric motive power, it has been found that repair expense decreases after the first few years of operation, due to the shop

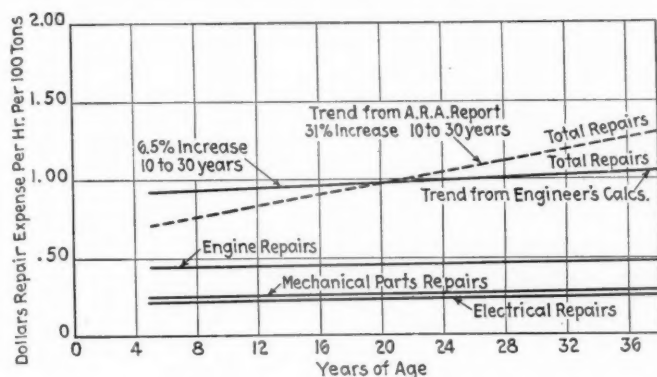


Fig. 6—Chart Showing the Trends of Repair Costs for Diesel Switchers

organization becoming familiar with repair procedure and requirements. The same thing has happened with gasoline-electric motor cars, and in view of this experience, it may reasonably be expected to occur with the Diesel.

It has been claimed that in analyzing a service, the Diesel manufacturer compares the repair costs of a new Diesel with those of antiquated steam power, thereby presenting fictitious economies as compared to the substitution of new steam power. Actually, the comparison in repair cost just shown by the trend curves is based on both the steam and the Diesel starting at scratch. Where a comparison is made between a new Diesel and old steam power, the Diesel side of the comparison is handicapped because the fixed charges of the steam are absent, although they must be included for the Diesel.

The reason for high repair expense of the steam locomotive may be found in the fact that the motive power includes a boiler under pressure. To guard against accident, stringent rules and regulations have necessarily been laid down, determining just what must be done at stated periods to insure that the motive power does not become unsafe. Such hazards do not exist with the Diesel, as the power pressures are generated only as needed and in small volumes. As to the ma-

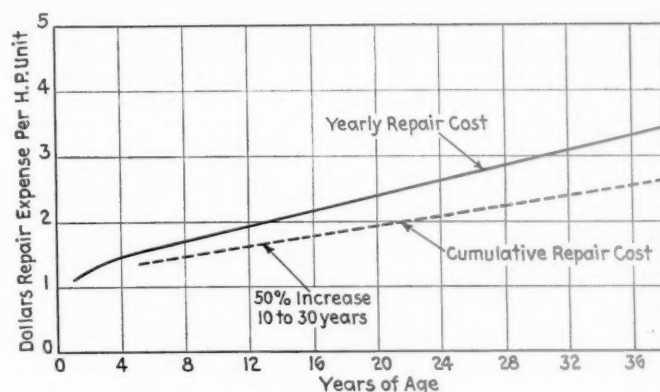


Fig. 7—Chart Showing the Trend of Repair Costs for Steam Switchers

chinery of a Diesel, it is doubtful if there is any more complication than on a steam locomotive when all parts are considered. It is only familiarity with steam equipment that makes it seem less complicated. As to the Diesel engine itself, there are relatively few repairs which are expensive, as all parts are readily replaceable.

The Diesel locomotive can and should be operated by one man. The second man on the locomotive is an economic waste, as he does nothing but relay signals to the engineer, which is an unnecessary and undesirable function. No operation with signals relayed is as safe as when the ground crew indicates the movements directly to the engineer. However, certain states have laws making it mandatory to have two men in the cab. Many railroads are operating with only one man in the locomotive, and where this may be done an appreciable saving results. In many applications, there is a further definite saving in locomotive and ground-crew expense, because the Diesel switches faster than steam and thus reduces overtime expense.

Enginehouse expense for a Diesel is a minimum. There are no ashes to dump, no fires to clean, no water tank to fill, and fueling is less frequent than for steam. It is not necessary to take the locomotive into the enginehouse for daily inspection, as this is frequently done during the crew lunch period or when crews change. This reduction in necessary attendance and the absence of boiler wash improves the availability from the normal steam availability of 50 per cent to 80 or 90 per cent. There are, of course, places where this high availability cannot be used, but in a busy yard, it reduces the number of locomotives required to handle the work.

In considering the real economies of Diesel power, there are often extra savings to be made by the elimination of ash pits, coal chutes, water tanks, boiler wash equipment and such attendant facilities necessary for steam operation. Such reductions are not, as a rule, included in the cost comparisons of the two types of motive power, yet they constitute a real and tangible saving where Dieselization removes the necessity of steam operation. Any study made to determine the economies of a new type of power should include these attendant savings. As Dieselization of complete divisions or locations is approached, such savings are greatly increased.

The component parts of a Diesel motive power unit—either rail car or locomotive—have inherently long life. The mechanical parts are well known and need no comment, differing little from types which have been in successful operation for years. The electric drive details are also service proved and are known to have long life. The Diesel engine alone has not been in existence long enough to convince the skeptics that its life will be

(Continued on page 534)

Regulators Discuss Motor Carrier Act at Annual Convention

National Association of Railroad and Utilities Commissioners met at Nashville, Tenn., on October 15-18

THE Motor Carrier act, the Federal Communications law and the Utility Holding Company legislation were the chief topics under discussion at the forty-seventh annual convention of the National Association of Railroad and Utilities Commissioners at Nashville, Tenn., on October 15-18, with an attendance of some 300 members and guests. Practically an entire session was devoted to each of these subjects, the one devoted to the Motor Carrier act taking the form of a round-table discussion led by Joseph B. Eastman, federal co-ordinator of transportation.

The discussion of all three of these recent acts of Congress centered largely around their influence on the prerogatives and responsibilities of the state commissions. Concern on this point was to be noted also in the reports of several of the association's committees, especially that of the Committee on Co-operation Between Federal and State Commissions, which presented an extended historical review of the efforts to effect such co-operation in-so-far as it concerns the relations between state and federal authorities in the regulation of railway rates. The subject was stressed also in the address of President Andrew R. McDonald, member of the Wisconsin commission, who reviewed the organized effort made by the association to safeguard the rights of the states in the drafting of legislation for the extension of federal regulation into new fields, while definitely fostering these legislative projects. In his opinion, these aims have been attained with a high degree of success. President McDonald endorsed the Motor Carrier act "as a long step forward toward our realization of an efficient, co-ordinated transportation system."

"The expansion of motor truck traffic," he continued, "has brought widespread confusion to our whole transportation situation. The railroads have been effected not only to the extent to which it has deprived them of sorely needed traffic, but as well in the resultant widespread demoralization of their rate structures.

"Economic justification may be found for some of the diversion of traffic from the rails where, considering both cost and service, the truck has proved the more efficient carrier. Such justification does not, however, extend to the large volume of low grade commodities such as coal, cement, sand and gravel hauled by trucks for long distances, because for them the railroads can and do provide cheaper handling with equal, or greater, speed and service. Trucks hauling low grade commodities not only deprive the rails of traffic they should have but constitute a menace to other motor traffic. The tremendous economic waste that results when one transportation agency performs at little or no profit (and not infrequently at a loss) services that another agency could profitably perform equally well, or better, presents a serious problem. The recently enacted Motor Carrier act, joined with the Transportation act dealing with the railroads, supplies the long needed means of working out our badly tangled transportation situation."

At the opening session, addresses of welcome were

made by Hill McAllister, governor of Tennessee, and Hilary E. Howse, mayor of Nashville, while greetings on behalf of the Interstate Commerce Commission were offered by its chairman, Hugh M. Tate, who declared that the commission is not "railroad minded," and in the exercise of the expanded powers which now include jurisdiction over the motor carriers, "will have no favorites except the general public."

In the election of officers, Frank P. Morgan of the Alabama commission was advanced from first vice-president to president and Thomas E. McKay of the Utah commission was advanced from second vice-president to first vice-president; Alexander M. Mahood of West Virginia became second vice-president and John E. Benton and Clyde S. Bailey were re-elected general solicitor and secretary and assistant general solicitor, respectively. It was voted to hold the next convention at Atlantic City, N. J., on November 10 to 13, 1936.

Co-ordinator Eastman Leads Discussion

At the session devoted to a discussion of the regulation of motor vehicles using the public highways, President McDonald introduced Mr. Eastman as the first speaker, with the explanation that the co-ordinator would also preside over the discussion that followed. Mr. Eastman addressed a considerable part of his remarks to matters that are of interest primarily to the members of the state commissions. Portions of his address having a wider appeal are abstracted below:

The motor carrier act of 1935 has laid on the shoulders of the Interstate Commerce Commission one of the biggest and most difficult jobs which has ever come its way. In this act we are given all at once the task of regulating in a very comprehensive manner a form of transportation, hitherto unregulated by the federal government and which, although still in its infancy, spreads over every foot of the country and is already of immense proportions. It is the first time, for instance, in which the commission has ever had anything to do with contract carriers, to say nothing of private operators of motor vehicles, over whom the new act gives us some measure of control in safety matters. It is the first time in which we have had anything to do with so-called transportation brokers. It is the first time that we have dealt with operators whose numbers run into hundreds of thousands.

Another new departure of the act is the provision that gives us the aid of joint boards made up of state commissioners or similar state officers, or their representatives. It may not be altogether a unique experiment in co-operation between the state and federal governments, but it is certainly a unique experiment so far as regulation is concerned.

Problems of Personnel

It was evident to us that we would need, for the new work, the help of men who had had extensive and special experience with motor carriers or with their regulation by the states, and it is this type of men that we have tried to get. Then the ques-

tion came up whether we should plant these men around, in whole or in part, among our existing bureaus, or concentrate them in a single bureau dealing solely with motor carriers, and the conclusion was reached that the single-bureau plan would be the best one to follow. We thought these men would do better if given direct responsibility than if they were placed under men who, good and trusted as they were, knew little of motor transportation and had their attention already occupied with other problems.

Extensive Field Organization

Another important reason for this decision was the need for an extensive field organization covering the entire country. There are so many thousand individual operators, many of them having only a single truck, that it is necessary to bring the regulation to them, instead of compelling them to bring their troubles to Washington on every occasion. These men in the field are also necessary because of our close association under the act with the state commissions and the necessity for securing their help and co-operation in many phases of the work.

One of the things that is disturbing us somewhat is the magnitude of the work that may be imposed on the state commissions, particularly, the joint board work. It is not at all unlikely that the volume of the work will be very large. It may be the thought that the initial work under the "grandfather clause" will be largely automatic. Yet there are numerous questions of fact and even of law, which are likely to arise with respect to such applications. For instance there is the question of fact as to whether the applicant did conduct operations on the routes and of the character described in the application. Mixed questions of law and fact may arise as to whether the applicant was in reality a common carrier or a contract carrier.

We think it not improbable that the number of applicants under the "grandfather clause" may be as great as 250,000. Even if the percentage on which hearings were required were small, the total number of hearings would nevertheless be great.

Procedure Must Be Simple

It is of utmost importance that the procedure under the Motor Carrier act should be as simple, prompt and expeditious as possible and all unnecessary delays avoided. Possibly at the outset it may be desirable for the commission to exercise its option of handling directly matters in which more than three states are involved.

It has come to my attention that there is at present a sharp difference of opinion among the motor truck operators as to how their rates should be constructed. Many are inclined to take the competitive railroad rates as a model, often adopting the same rates on the theory that because of the excellence of their service they can get sufficient business on that basis, or making their rates a certain percentage or differential lower than the railroad rates. I believe there are even cases where they have made them a percentage higher. Other operators believe that their service and mode of operation are so different from those of the railroads that they should construct rates quite independently of the railroads, simplifying classifications and basing the rates on the average cost of service plus a reasonable profit. In following this cost basis, some of these operators propose to make differing rates per 100 lb., according to the weight or size of the shipment.

Of course these two methods of making rates differ fundamentally, and some of the operators would be glad to have the commission say which method they should follow before rates under the act are actually filed. I have been unable to see how this course could be followed. The act does not contemplate that the commission shall initiate rates, but only that it shall regulate them. It leaves the carriers free to file such initial rates, when the rate portion of the act takes effect, as they see fit, subject to such rules as the commission may prescribe for the filing and publication and subject, of course, to its subsequent regulation in appropriate proceedings.

However, it is plain that the issue is a fundamental one which will sooner or later be presented in all of its ramifications, and it is one to which we must all be giving thought. The act makes it necessary for the commission, in passing upon the rates of common carriers, to give due consideration, among other factors, to the "inherent advantages of transportation by such carriers" and to the "need, in the public interest, of adequate and

efficient transportation service by such carriers at the lowest cost consistent with the furnishing of such service." In the case of contract carriers, the "cost of the services rendered by such carriers" is specifically mentioned as a factor.

What Kind of Cost

But this is not all that must be considered in connection with rates in their relation to cost of service. There are at least two kinds of cost. One may be called "out-of-pocket cost," and the other may be called "full cost." Carriers, whether they be railroads or water lines or motor trucks, often make competitive rates on the basis of "out-of-pocket cost." They figure that if they can a little more than cover any additional expense which the competitive service imposes, considering the basic service which they must furnish in any event, they are just that much better off. This is a theory which can probably be followed to advantage when competition is sporadic or exceptional. The important question, and one which we shall have to face, is whether it can be followed to advantage when competition is widespread and the general rule. The "out-of-pocket cost" theory is, of course, one which every form of transportation may follow, and it would certainly seem that if it is permitted in one case it must fairly be permitted in all.

I sometimes think that we shall ultimately find that the only stable and satisfactory basis of rates will be to use full cost as the basic guide in all cases, and let each form of transportation handle the traffic where it is able to handle it more efficiently and economically than any other. This, however, is mere speculation, for the question is one upon which I must maintain an open mind until all the facts are before me.

Discussion

Robert H. Dunn, chairman of the Committee on Motor Vehicle Legislation and formerly a member of the Michigan commission, who followed Mr. Eastman in this discussion, declared that the state commissions were in a position to render invaluable aid to the federal commission in the regulation of the highway carriers and that the success of such regulation would depend largely on the degree of co-operation effected. It is his opinion, also, that the prospect for future legislation providing for the regulation of pipe lines and water carriers will depend largely on the success that attends the administration of the Motor Carrier act.

The subsequent discussion, which occupied the better part of two hours, was devoted primarily to the asking of questions relating to interpretations of the act or regarding the plans for its administration, most of which were directed at Mr. Eastman. However, in a number of cases he replied that the preparation and studies made to date did not permit of definite answers. One question related to the status of the wholesale merchant as a private carrier, to which Mr. Eastman replied that the answer was one of both law and fact, particularly as to whether the movement was a bona fide private operation. G. H. English, of the Missouri commission, reported the conviction in his state of a truck operator who had misrepresented his status, and of a shipper as an accessory to the fraud.

However, the greater part of the discussion centered around the extent to which the administration of the act would curtail the authority of the state commissions over the use of the highways in their respective states. A particular point was raised by W. M. Smith, chairman of the Michigan commission, who cited a hypothetical case of an application for a certificate to operate between Chicago and Detroit, and inquired whether the applicant would be required to apply subsequently to the state commissions for the assignment of routes over the highways of each of the states. Mr. Eastman replied that it was up to the Interstate Commerce Commission either to deny or grant the certificate and not to decide what the states may do in this case. However, he called attention to the provision in the law that the certificate shall

specify both the service to be rendered and the route, and added that the states may present evidence concerning routes in the hearings before the joint boards in which they participate. President MacDonald was of the opinion that most of the available routes are "pretty well covered" and that there was no obligation to provide a route for every applicant.

A number of speakers urged the importance of safeguarding the revenues of the states, for while assured of the continued rights of the states to tax carrier vehicles on the highways, they expressed concern lest the revised administration under the new law might interfere with the machinery for the collection of such taxes. However, Mr. Eastman contended that there was no occasion for concern on that score, although it is a fact that some operators are under the impression that federal regulation will enable them to avoid the payment of state license fees.

The discussion also disclosed considerable uncertainty concerning the administration of the provision of the act relating to safety of operation. Mr. Eastman referred to the broad powers conferred on the commission, but stated that he did not propose to go into this phase of the task before him hastily. The states, he continued, should have a large part in this, but regulations affecting safety should be as nearly uniform throughout the country as possible. This view was endorsed by several of the state commissioners, who called attention to the diversity of requirements covering such details as lights. The consensus of those present favored the regulation of the weight and size of trucks by the states.

At least two speakers confirmed Mr. Eastman's estimate as to the number of carriers who may be expected to make applications under the provisions of the "Grandfather" clause, the impression conveyed being that his estimate was probably too low. It was indicated, also, that many of the carriers may be expected to make extravagant and unwarranted claims as to their existing status, but it was pointed out that the form for the making of applications provides for a definite tendering of evidence concerning the rights now enjoyed by the applicants. In concluding the discussion, Mr. Eastman declared that some questions must go before the courts, regardless of how well the state and federal commissions co-operate, but any conjecture on the outcome of litigation must take into account the fact that previous decisions were rendered before any part of the field was occupied by the Interstate Commerce Commission.

Other Subjects Discussed

In a report devoted largely to a review of railway accident statistics, the Committee on Safety of Operation directed attention to the progress being made by the railroads in accident prevention. Referring to trespassers, the committee pointed to the need for greater co-operation from public authorities in developing more effective policing, for the railroads "with a limited number of special police, cannot adequately and properly control the 250,000 miles of rail lines." The committee also commented favorably on the allotment of federal funds for grade separation, but appended the following significant statement.

"While the problem of elimination is of first importance, the great majority of grade crossings cannot be considered for elimination within the federal allotment; therefore, the continuance of the installation of protective devices at grade crossings is essential and should be contemporaneous with grade eliminations. For many future years, travel must depend for safety in a large measure upon means of protection other than crossing elimination. The allocation of a portion of the fed-

eral funds for the installation of protective devices is, therefore, timely."

The committee also urged more stringent regulation of the length of vehicles using the highways, citing an accident at a railway-highway crossing in New Jersey in which the crew of an engine were burned to death following a collision with a gasoline truck and trailer having a total length of 55 ft.

Recommendations of Grade Crossing Committee

Safety at grade crossings rather than grade separation was the subject discussed in the report of the Committee on Grade Crossing Elimination and Protection, which devoted considerable attention to the influence of the physical condition of the crossing on the potential hazard imposed. Abstracts from its report follow:

Crossings on steep and narrow grades present conditions that would not be tolerated at any other point on an ordinary unimproved country highway. Add to this the narrow planking, often narrower than the narrow roadway, and we have a condition that causes what we call "accidents." Cars are slowed down when the front heels strike the plank and stalled when the rear wheels reach it. That is the apparent cause of many collisions, although the driver rarely lives to tell of it.

The grade of the highway at grade crossings should not exceed one per cent for a distance of at least 50 ft. on each side of the crossing, the width should be not less than at any other place on the highway, and the planking should be slightly wider than the highway. In other words, the conditions should be such that the driver can give his almost undivided attention to watching for approaching trains.

No advertising signs, signals, or flashing lights, other than highway signs should be permitted within a certain distance of any grade crossing or highway intersection. In fact, if all advertising could be taken from the highways for a distance of at least 500 ft. on each side of the road, it would be a distinct improvement.

The committee's recommendations were as follows:

Additional appropriations of federal funds for grade separation and protection under the Emergency Relief act of 1935.

Special attention by the committee in 1936 to the various new devices, such as gates, barriers, lights, etc., that appear to be well suited to the purpose.

The adoption of the standards of the Joint Committee on Grade Crossing Protection of the A.A.R., Bulletin No. 2, July, 1935, for signs and lights at crossings.

The operation of all safety devices for the full 24-hour period, no part time operation to be permitted, except in such instances as it is positively known that there will be no train operation over the crossing during the time that the operation is suspended.

Deplore Lack of Co-operation

Alleged failure of the Interstate Commerce Commission to co-operate with the state commissions to the fullest extent provided by law was touched upon in two of the committee reports presented at the convention, and actively discussed from the floor. The report of the Committee on Co-operation Between Federal and State Commissions, previously referred to, was especially critical of the conduct of the so-called "Shreveport" cases. "The decision in such cases," the report stated, "appears to be predetermined, and to be based on the fact that the state commission has not permitted the same advanced rates that have been permitted by the Interstate Commerce Commission applicable to interstate rates. It appears to indicate the belief that the state has no right to consider or determine the propriety of an advance of intrastate rates after the federal commission has permitted a general advance of interstate rates."

In a similar vein were the comments of the Committee on Railroad Rates on action in what it deemed might properly be termed "carrier revenue cases." "The recent applications for emergency freight increases strik-

ingly illustrate the practice, and demonstrate, in our opinion, the inadequacy and unsatisfactory character of the procedure frequently followed. After the Interstate Commerce Commission granted the increase in interstate rates, the carriers in most cases simply presented to the state commissions a transcript of the testimony before the I. C. C. and rested their cases. Do the carriers regard such proceedings merely as a perfunctory preliminary step leading to "thirteenth section" proceedings? If that is to be the accepted practice, then it would be better to save the time and expense, and empower the I. C. C. to

act in the first instance on state rates in connection with the application for general increases in interstate rates."

Following the presentation of the report, the question was put to Homer Hoch of Kansas, chairman of the committee, as to whether there was anything that the state commissions could do about it, and the general consensus was that relief could be expected only through an amendment of the Interstate Commerce act that would safeguard the rights of the states, along the lines of the provisions for this contingency introduced into the Motor Carrier act.

Associated Traffic Clubs Meet at Indianapolis

Education of employees leading to managerial positions had
large place on convention program

THE education of officers and employees in the traffic departments of railways and industries received primary attention at the semi-annual meeting of the Associated Traffic Clubs of America at Indianapolis, Ind., on October 15-16, at which 896 representatives were in attendance. At this meeting 56 traffic clubs, out of a total of 67 clubs having a combined membership of 15,568, were represented by delegates. Two additional clubs were admitted to membership at the meeting, bringing the total to 69.

This association is developing a definite program of education under the direction of a Committee on Education, of which Dr. G. Lloyd Wilson, professor of commerce and transportation, University of Pennsylvania, is chairman, which is being carried out by the individual clubs. The subjects embrace transportation, traffic, operation, solicitation and allied subjects and, in a number of instances, public speaking. The Wednesday morning session, at which Dr. L. C. Sorrell, professor of transportation, University of Chicago, presented a paper on Education for Rail Traffic Management, was given over to reports from the various clubs represented at the meeting, of the progress they have made in carrying out this program.

Other addresses were made by Luther M. Walter, interstate commerce counselor, Chicago, on What Is the Public Interest in Transportation Regulation; and by Robert S. Binkerd, vice-president, Baldwin Locomotive Works, Philadelphia, Pa., on Cars and Locomotives of the Future; while Harry A. Wheeler, president, Railway Business Association, Chicago, spoke at the dinner on Tuesday evening on Government Ownership—Is It Imminent or Inevitable? Governor McNutt of Indiana also spoke at the dinner.

At the opening session, a resolution was adopted unanimously, opposing the Waggoner bill now before the United States Senate, which would prohibit other than duly licensed attorneys from appearing at hearings before any government department.

Election of Officers

Officers were elected for the ensuing year as follows: President, Homer S. Snow, American Zinc, Lead & Smelting Company, St. Louis, Mo.; executive vice-president,

John M. Fitzgerald, vice-chairman, Committee on Public Relations of the Eastern Railroads, New York; second vice-presidents, F. E. Leubbe, Kroger Grocery & Baking Company, Cincinnati, Ohio; Lamar W. Land, Southwestern freight agent, Baltimore & Ohio, Dallas, Tex.; M. M. Goodsill, general passenger agent, Northern Pacific, St. Paul, Minn.; C. R. Musgrave, Phillips Petroleum Company, Bartlesville, Okla.; and G. Lloyd Wilson, professor of commerce and transportation, University of Pennsylvania, Philadelphia, Pa. Frederick A. Doebber, traffic manager, Citizens Gas & Coke Utility, Indianapolis, Ind., was re-elected secretary, and William T. Vanderburgh, commercial agent, Seaboard Air Line, Louisville, Ky., was re-elected treasurer.

What Is the Public Interest?

Mr. Walter reviewed the history of interstate commerce legislation up to and including the act which created the Interstate Commerce Commission, and discussed the importance of a number of court decisions which played a large part in shaping early transportation legislation. He showed that it was primarily because local selfish interests had placed restrictions on commerce during colonial days that the interstate commerce clause was inserted in the Constitution for the definite purpose of eliminating these restrictions on commerce between the states.

He said that all experience since the adoption of the Constitution has pointed to the fact that it is for the best interest of the public that transportation shall be organized for the benefit of the country as a whole, as contrasted with permitting developments that create special benefits or privileges for particular groups or localities. He warned, however, that today, as in colonial times, there is a continuing agitation by small and highly vocal groups that are constantly seeking and fighting for particular advantages in transportation, as in other matters, the very condition which was one of the basic reasons which brought about the union of the colonies to form the United States. This is exemplified by the fact that for years a small minority has been successful in blocking any sort of regulation of transportation by water.

There had been no public demand for the act which

created the Interstate Commerce Commission, he said, and practically none for most of the transportation legislation which followed this act. Although some of it has been in the public interest, some of it has been of doubtful benefit. Mr. Walter also called attention to the fact that almost all legislation relating to transportation is restrictive and punitive rather than constructive and encouraging. He stated that the recent Motor Carrier Act is in direct sequence with other regulatory laws, and that through it the government now has complete jurisdiction over the highways of the country as arteries of interstate commerce.

Mr. Walter said that in passing regulatory laws, it has been the motive of Congress to see that all interests are treated alike, for which reason provision has been made for the publication of rates and jurisdiction has been assumed over abandonment of facilities, construction of new lines and acquisition of existing lines. He indicated that he was not in complete sympathy with the idea of consolidating the railways into a few systems, for he believes that in transportation, as in commercial activities, competition is better than monopoly, even if some of the competition is of the cut-throat variety, but that while we need a reasonable amount of competition, it does not need to be either wasteful or foolish.

In his opinion the act permitting the reorganization of financially weak carriers was in the public interest to assure dependability of service. Where public interest and private interests clash, the private interests and integrity of contracts must give way to the former.

In discussing the Motor Carrier Act, Mr. Walter said that there is a widespread but erroneous belief that this act is entirely in the interest of the railways. On the contrary, it is primarily to the public interest to establish reasonable rates, dependability of service and safety of operation. Only in so far as this act and its administration are in the public interest is it also in the interest of the railways.

He warned that if the public interest is to be served to the fullest extent all discussions of transportation matters should be untrammelled by political interest. Regulation should be intelligently performed with judgment, and with only the public interest in mind.

Education for Rail Traffic Management

Professor Sorrell's paper on Education for Traffic Management included a discussion of the basic requirements for such an educational system, which should be devised to develop personality, the ability to acquire useful information and to discriminate between essential and nonessential facts, to meet difficult situations and to gage the other fellow, as well as to teach the underlying principles of the transportation and traffic professions. He had no set program or dogmatic theories as to the method of acquiring an education leading to traffic management, but he stated 14 fundamental requirements which should be observed in outlining a course of training for traffic men.

In his address, Mr. Wheeler discussed the importance of the railways in the transportation field, the conditions favoring government ownership and the conditions that will avert it, the regulation of railway competitors and how the government can assist the railways under private ownership. This paper will be published in a later issue.

Cars and Locomotives of the Future

In his discussion of the future for light-weight cars and locomotives, Mr. Binkerd reviewed developments from the beginning of the railways to 1930, during which

period, he said, the requirements of constantly increasing traffic were met by building heavier locomotives and larger and heavier cars, both passenger and freight, and by reducing grades, revising the alinement to decrease curvature and building stronger track. Continuing, he said, in part:

We are now in a new era in which the future growth of railway traffic will bear some direct ratio to the future growth of population of this country and no longer have the geometrical ratio of growth which it had when we were still engaged in settling this country and developing the modern economic system. An entirely new form of reducing the amount of work required to be done is at hand. Existing grades, curves and distances may largely remain, but the deadweight required to be moved can be substantially decreased. Hence we may look to a lightening of the dead-weight of cars, both freight and passenger, as one of the outstanding movements of the era immediately ahead of us.

It is interesting to note that in applying the possibilities of weight reduction to freight equipment no one is proposing a new form of construction which makes the new unit absolutely non-interchangeable with the existing freight cars of the country. All of the developments in freight car design, whether radical or conservative, are within the limits of interchangeability with existing equipment. They obviously anticipate a long period of evolution in which the freight trains of the country will be made up of varying combinations of old and new cars.

When we come to the lightening of passenger cars, however, we find two distinct schools. One of these schools is applying the same basic principles to standard passenger-car design as are being applied to standard freight-car design. The other school has abandoned the fundamentals of conventional car design. It is achieving still greater reductions in dead-weight, but at the price of non-interchangeability. When one takes into consideration the wide fluctuations in railroad passenger traffic among the various seasons and even between the different days of the week, and the necessity of through car service, it is difficult to see how equipment having this rigid inflexibility can ever become the general answer to the passenger service problem of our railroads.

When we come to lightening power units, we must draw a sharp distinction between the locomotive and the dead-weight of the train behind it. Traction can be secured only with weight and the greater the power of the engine the greater the weight that must be on the driving wheels to make the train move forward. Hence within large limits, the dead-weight of the prime mover is an asset without which it cannot perform its job. In other words, lightening the dead-weight of motive power is essentially and distinctly a separate problem from lightening the dead-weight of cars.

Both Diesel and steam power are subject to the same laws governing the dead-weight essential to traction. The outstanding characteristics of Diesel power are its high tractive force at starting, but its rapid loss of that force with increasing speed, resulting in an inability to take any over-load in road service. The outstanding characteristics of the steam locomotive are a relatively lower tractive force at starting, but a much smaller loss of that force at speed, and the ability to take a substantial over-load and still do a job with it in road service. When you bear in mind that the capital cost of the Diesel locomotive is approximately three times that of a comparable steam locomotive and that the savings in interest, depreciation, taxes and insurance on the lower investment are certain, whereas the future fuel and maintenance costs of the Diesel locomotives are uncertain, those persons who look for the rapid decline of the steam locomotive are going to be disappointed.

Nevertheless, while believing that steam must continue to be the chief prime mover for many years to come, we have nothing but thanks for the railroad managements which are courageously using their present slender resources in experimenting with the lightening of dead-weight of railroad equipment and in developing to the utmost the various forms of power. They are an outstanding answer to those who can see no future in railroad-ing and cry because they think all of the pioneering has been done. The old forms of pioneering were child's play compared with those in which we are engaged today. Those railroad managements are pioneers in the truest sense of the word.

Interlockings Consolidated at Houston, Tex.

Six plants and set of outlying switches
combined into two central interlockings—
Color-light automatic block signals added—
Outlying telephone-whistle signals used

By W. A. Stahl

Assistant Engineer Signals
Missouri Pacific Lines

Westward Home Sig-
nal at Crossing 76
Now Controlled from
Tower 80



In the vicinity of Houston, Tex., the Missouri Pacific Lines and the Southern Pacific Lines have joined in an extensive program of consolidating interlockings, to facilitate train operations by concentrating the control at fewer points and also to reduce operating expenses. An outstanding portion of this program involved six interlockings and a set of outlying hand-thrown switches, the control of which has been brought into two control stations.

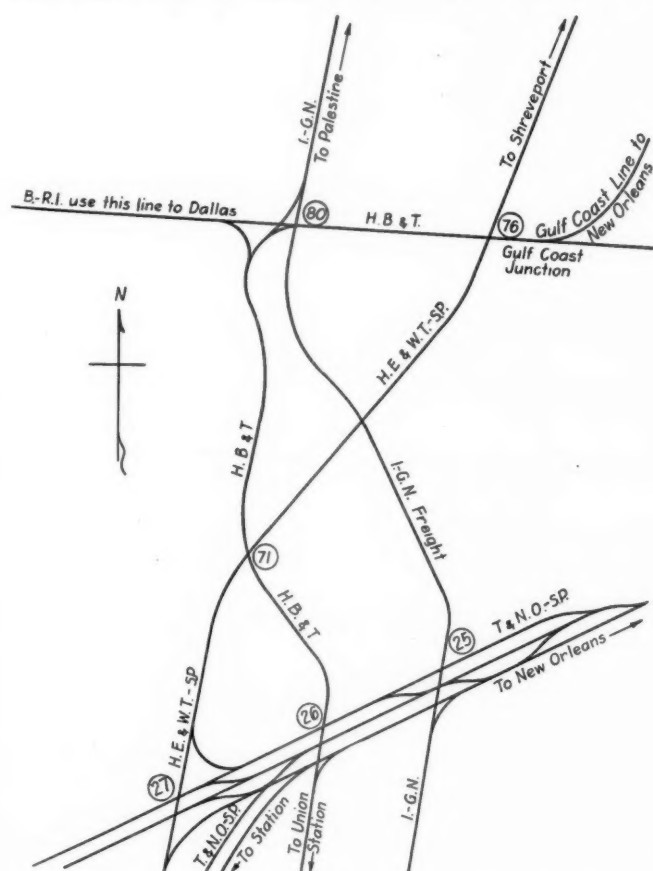
The first change in the consolidation, effected several years ago, was to extend the control of electric inter-

locking No. 26 to include interlocking No. 27 at the crossing of the H. E. & W. T., about 6,000 ft. west of Tower 26. In 1928, interlocking No. 25, at the crossing of the T. & N. O. and I.-G. N., was also in Tower 26.

The plant at No. 25 was of the all-electric type, including 30 operating levers, plant No. 26 was of the same type with 40 working levers. The consolidation, handled by T. & N. O. signal department forces, consisted of moving the interlocking machine from Tower 25 and placing it in Tower 26 to form a continuous machine of 70 levers. With the completion of the consolidation, interlocking No. 26 controlled three crossings and several junctions, as indicated in the accompanying illustration showing the illuminated track diagram. In view of the fact that train movements in this area must of necessity be co-ordinated, it has been more satisfactory to control the entire layout from one machine rather than endeavoring to get three or more towermen to co-ordinate their efforts.

In 1930, the 16-lever mechanical interlocking No. 76, at the crossing of the H. B. & T. and the H. E. & W. T., was eliminated, the control being transferred to a set of desk levers placed in Tower 80. As the crossing at old No. 76 involved only two single-track lines, it might seem that an automatic interlocking would be satisfactory. However, the fact that Tower 80 was only $\frac{3}{4}$ mile away offered an excellent opportunity to use lever control, thereby affording a means of giving preference to passenger trains over transfer freight trains.

In 1934 the Burlington-Rock Island added two fast passenger trains to its schedule between Houston and Dallas. These trains operate into and out of Houston over H. B. & T. tracks, diverging to their own line over hand-throw switches located about 1,500 ft. northeast of Tower 80. To obviate the delay occasioned by handling these switches, two dual-control electric switch machines, G. R. S. Model-5D, were installed at the switches, and the home signals were moved back to direct the operation of trains in this area, thus including this complete junction in the interlocking limits. These new facilities are of special assistance in handling train meets. For illustration, when the southbound B.-R. I. train is a few minutes late, it encroaches on the time of northbound I.-G. N. train No. 26, and on such occasions, the dispatcher sends a "hold" order directing



Six Interlockings in This Territory Are Now Consolidated into Two



Interlocking 71 at Crossing H. B. & T. and H. E. & W. T. Is Now Controlled from Tower 26

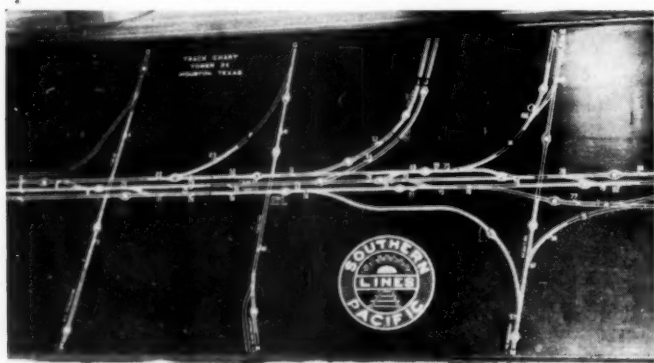
the operator at Tower 80 to leave the home signals at stop against the B.-R. I. train until the I.-G. N. train passes. Thus the meet is made without any special movements on the part of either train.

Automatic Signals Provided

Along with the various changes in interlockings, automatic block signals were installed on 20 miles of I.-G. N. single-track main line from Spring, Tex., to Tower 80, and on the single-track of the H. B. & T. from Tower 80 to Quitman street in Houston, not far from the Union station. While this installation was being made, the mechanical signals in the plant at Tower 80 were replaced with color-light signals. Automatic signals were also installed on the 35 miles of single-track main line of the Gulf Coast Lines between Kenefick, Tex., and Gulf Coast Junction, the latter point being on the H.B.&T. two miles from Tower 80. This left a gap of two miles in the automatic block system. However, as old Tower 76 was located in the center of this gap, the changeover from a mechanical plant to remote-control protection for this crossing introduced new color-light home and distant signals which completed the automatic block signal protection throughout the two-mile gap.

Special Communication and Whistle Signals

The Missouri Pacific automatic block signal rules make it necessary to provide a telephone at each absolute signal for the use of trainmen. The telephones located at the home signals in the Houston area, as discussed in this article, are all connected to a line which extends to loud speakers in towers 26 and 80. At Tower 80



The Illuminated Diagram in Tower 26 Shows the General Layout of the Three Crossings and Several Junctions Now Included in One Plant

switches are provided to connect the entire telephone system to the dispatcher's line or to the city telephone system.

It is often necessary for the engineman of an approaching train to give locomotive whistle signals to let a towerman know which train is approaching, in order that the proper route may be lined up. Furthermore, switching trains may want to call for a route different from the one set up. Therefore, on account of the extended area controlled, it was desirable to have the whistle signals at the various crossings and junctions repeated in the two towers. After experimenting with microphones, it was found that the desired result could be accomplished simply by energizing the transmitter of the regular telephone in the booth at a signal, this being controlled through a back contact of a track relay. No special apparatus or special location of the telephone is required, for when a train passes one of these telephone stations, the transmitter is cut in, and the noise of the passing train and the whistle signals are brought into the towers over the loud speakers.

For the interlocking consolidations and automatic signaling carried out on the Missouri Pacific Lines, the color-light signals, relays, cases, switch machines, desk levers, etc., were furnished by the General Railway Signal Company. The two longer stretches of automatic block signals were installed under contract by the General Railway Signal Company, but the interlocking consolidations and rearrangements were made by the signal forces of the railroad.

Why the Diesel Engine Is a Good Railroad Tool

(Continued from page 527)

as long as that of the rest of the locomotive. There is, however, an indirect indication of engine life from the performance records of gasoline engines manufactured from 25 to 30 years ago and still operating daily in rail service. The Diesel engine as built today should have even better life, as all wearing parts are easily replaceable and thus the engine may be restored to its original condition at overhaul periods without excessive expense. There is no basis, then, for setting the depreciation rate higher than for steam equipment; in fact, the reverse should be true and steam motive power should be written off of the books at a faster rate than has been customary, not because they will wear out faster, but because of obsolescence. This applies particularly to switching power and light road power.

The Field for Diesels Will Grow

It is not claimed by anyone familiar with railroading and also with Diesel equipment that the steam locomotive is doomed to extinction. The higher first cost of Diesel motive power will always make it profitable to operate steam in some services. The real field of today is where power reductions may be made by Diesels and advantage taken of their economies—such as in switching service and for light passenger trains—thus reducing the initial investment in this type of power. As time goes on, however, and the development of Diesel manufacture progresses, the relative first costs of steam and Diesel motive power will get closer together, thus broadening the field for this modern motive power.

Safety Conference Held at Louisville

By preventing accidents railways have reduced the drain
on revenues many million dollars

THAT accident prevention has protected the revenues of the railways to the extent of approximately \$300,000,000 in 10 years by reducing the amount of money paid for property damage, and for fatalities and injuries to passengers and employees, was demonstrated at the fifteenth annual meeting of the Safety Section of the Association of American Railroads held at Louisville, Ky., on October 15-17, Chairman Thomas H. Carrow, superintendent of safety of the Pennsylvania, presiding.

The extent of this saving was developed in the discussion of the value of accident prevention which showed that charges to injuries, fatalities and property damage were reduced from \$79,000,000 in 1923 to \$29,000,000 in 1933. The value of accident prevention was forcefully demonstrated in an address by Frank Wenter, Jr., general claim agent of the Chicago & North Western, who used claim expenditures as a yardstick. In 1920, the personal injury accounts of this railroad amounted to \$1,987,151, or 1.41 per cent of its gross revenues, but due to increased efforts to prevent accidents it was reduced to \$1,110,217, or 0.75 per cent in 1925; to \$749,465, or 0.61 per cent in 1930; and to \$333,187, or 0.43 per cent in 1934. At the same time, accident prevention activities on the North Western brought about a large saving in the cost of clearing wrecks and the cost of damage to property, the former being reduced from \$515,758 in 1920 to \$24,904 in 1934, and the latter being cut from \$230,536 in 1920 to \$21,717 in 1934.

The growing importance of accident prevention was also reflected in the large attendance, numbering 8,000 persons, at the twenty-fourth annual Safety Congress of the National Safety Council, Inc., the steam railroad section of which has been united with the Safety Section of the Association of American Railroads. John E. Long, superintendent of Safety of the Delaware & Hudson, has been president of the National Safety Council, Inc., for two consecutive years, and is the first railroad man thus honored. A. V. Rohweder, superintendent of safety and welfare of the Duluth, Missabe & Northern, was elected vice-president for industrial safety of the Council.

The railroad safety section meeting was attended by 450 representatives of the railroads, who discussed the reports of committees and the addresses made by several railway officers. Officers elected for the ensuing year are: President, C. F. Larson, superintendent of safety of the Missouri Pacific; first vice-president, E. A. Meyer, manager of the safety department of the Chicago, Milwaukee, St. Paul & Pacific; and second vice-president, E. G. Evans, superintendent of safety of the Louisville & Nashville.

M. J. Gormley Addresses Convention

M. J. Gormley, executive assistant of the Association of American Railroads, in an address, showed that the railroads furnish the public the safest form of transportation of any common carrier operating on or over the land. "On the highways," he said, "there is 1 fatality for each 20,000,000 passenger miles; on the airways, 1 fatality for each 24,000,000 passenger miles; and on

the railways, 1 fatality for each 400,000,000 passenger miles. In the first six months of 1935, no passenger was killed in a train accident on the steam railroads, despite the fact that the volume of passenger traffic was the largest since the corresponding period in 1931. This was the third time within the past four years that the steam railroads have had a perfect record with regard to passenger fatalities in train accidents in the first half of the year.

"While there has been a general decrease annually in the number of fatalities resulting from highway-railroad grade crossing accidents since 1928, the peak year, there is still an unnecessary waste of life resulting from such accidents, particularly since statistics show that approximately 40 per cent of the accidents result from motorists driving into the sides of trains.

"Due to the increased use of public highways in recent years, particularly for the transportation of passengers and freight, there is a growing recognition of public responsibility for increased safety at highway-railroad grade crossings. An increased feeling also is developing throughout the country that perhaps the railroads have been burdened too heavily in the past and that the public should assume the cost of protecting such crossings. The federal government recently allotted \$200,000,000 for the elimination and protection of highway-railroad grade crossings and this money is to be allocated to the various states. The expenditure of this sum will bring about the elimination of only a small proportion of such crossings but it is a step in the right direction.

"In connection with any program for the elimination of highway-railroad grade crossings, however, some regulatory power over the creation of new grade crossings should be created. The necessity for this is shown from the fact that from 1926 to 1933, inclusive, 12,370 grade crossings were eliminated, while at the same time 12,514 new grade crossings were created, or a net increase of 144 crossings.

"In the past five years there has been a general increase in the number of fatalities among trespassers on the railroads, with the result that in 1934 nearly 2,700 persons lost their lives. It is difficult to see how a transportation agency can equip itself to meet this particular kind of responsibility and yet something must be done about it.

"While safety among passengers and employees of the railroads has been constantly improving in the past 10 years, the number of fatalities resulting from grade crossing accidents and from trespassers on railroad property has been growing larger. Ten years ago 69 per cent of the fatalities resulted from grade crossing accidents and accidents to trespassers, while in 1934 it was 83.6 per cent."

Value of Accident Prevention

Frank Wentner, Jr., in an address on the value of accident prevention, said in part, "We are all agreed that the first object of accident prevention is the saving of human life and limb, and we must steadily carry on in this humane work. However, this should not stop

us from evaluating accident prevention achievements from an economic point of view. I believe we have not sufficiently stressed the economic costs of our claim payments chargeable to our casualties, nor have we utilized them as an accident prevention stimulator with our supervisory forces.

"I know of no one yardstick which, taken alone, will measure the value of accident prevention activities. However, the trend of claim expenditures taken over a reasonable term of years, should indicate fairly well what progress is being made. Not having available figures embracing all the railroads in our country, I give you the figures of my railroad.

"Our personal injury account amounted to \$1,987,151, or 1.41 per cent of gross revenues in 1920; \$1,110,217, or 0.75 per cent of gross revenues in 1925; \$794,465, or 0.61 per cent of gross revenues in 1930; and \$33,187 or 0.43 per cent of gross revenues in 1934.

"Looking into our figures further I find what savings the accident prevention activities have brought about in the cost of clearing wrecks, and the cost of damage to property. Clearing wrecks amounted to \$515,758 in 1920 and only \$24,904 in 1934. Damage to property amounted to \$230,536 in 1920 and only \$21,717 in 1934.

"Safety first has its two sides: (1) The humane side and (2) the economic side. Both are important, and it would seem that management, in recognizing the human and economic values arising out of accident prevention, must see to it that the safety departments are properly equipped to carry on. Safety, in my opinion, involves observation, education, admonishment and discipline.

"The safety man can function, so far as observation and education are concerned, but the elements of admonishment and discipline call for the co-operation of other departments. The safety man must receive the whole-hearted cooperation of these other departments as to the last two elements, to-wit, admonishment and discipline. If the safety man fails to receive this support and in consequence thereof the supervisory forces of the railroad are not committed by the management whole-heartedly to an insistence upon accident prevention, the safety man only achieves varying degrees of inefficiency. I feel in the order as mentioned we have an uncritical and efficient program of accident prevention activities: (1) Observation of what is wrong or will become wrong; (2) education to correct the situation; (3) admonishment, a warning that must be heeded, and if not heeded, (4) discipline. If we leave discipline out of the picture, we can just as well assume enforcement of our laws in the statute books against murder or other crimes, and leave out of the law the penalizing clause effective after the breach of such laws."

Safety Not a Fad

James J. Donahue, general claims attorney of the Louisville & Nashville, in a general talk on safety, said in part: "In 1927, fatal and non-fatal accidents cost the Louisville & Nashville \$1,001,511, while in 1934 the cost was only \$315,055. These figures tell their own story, looked at through the glasses of a humanitarian or through those of an economist. They reflect a casualty decrease from 21.38 per million man-hours worked in 1927 to 5.45 per million man-hours worked in 1934. During 1911, about the time the safety movement was inaugurated, 2,871 employees on duty were killed on American railroads and 45,848 received injuries that did not result in death. In 1933, the number of fatalities to employees on duty had fallen to 330, while non-fatal injuries were only 6,383.

"In the face of a record so glorious there are no skeptics now. You will find none who will be heard

to say that safety is a fad or that nothing worth while can be accomplished through efforts put forth in the direction of safer methods and practices. The movement is deserving of, and is receiving, our very best support. We should continue to do all in our power to foster it, to the end that accidents—no matter where or how occurring, fraught with consequences so terrible, to men and, as a necessary corollary, their loved ones—may be reduced to an absolute minimum, if not entirely eliminated. There is no limitation to the results that may be produced by safety activities."

Roy V. Wright, managing editor of the *Railway Age*, in an address on transportation by rail—speed with comfort and safety, described the public demand for speed and reviewed the improvements in railroad operation which have made possible the speeding up of trains without lessening the safety of the public and railway personnel. Special emphasis was placed on what has been done to insure the safe operation of the high-speed trains placed in service during the last year. Mr. Wright's address appeared in the *Railway Age* of October 19.

Accidental Death Rate Too High

John E. Long, in his presidential address opening the Safety Congress, called attention to the growing number of accidents caused by airplanes and motor vehicles, saying "The council recommends uniformity of traffic ordinances throughout the country, with just enforcement of reasonable regulations and the extension of drivers' license laws, with adequate examinations as a means of keeping the obviously unfit off the highways and as a means of control over all motorists. I think it is becoming increasingly evident to all of us that the present trend of motor vehicle deaths will inevitably result in more drastic methods of control over motorists. It may even amount to regimentation, regrettable as such measures would be. It remains to be seen whether motorists can develop sufficient judgment and self control to forestall more drastic regulation. We must remember that the laws now on our statute books, including many that are unworkable, are there because some evil called for correction.

"In the industrial field we find the problem of occupational diseases overshadowing many of our other problems. I am sure we would be happy if we could confine our activities to the humane work of prevention, but safety work cannot always be divorced from the complicated results of disability. So we find ourselves at times confronted with medico-legal situations. The safety movement has no sympathy with any effort to reduce accident costs by the avoidance of just claims but our whole system of compensation is complicated by some very human traits. Compensation, particularly in the field of occupational diseases where responsibility is often vague, sometimes degenerates into a form of relief."

In his address before the railroad section, President Long said, that as a result of accident prevention activities on railroads there are more than 198,000 persons alive who would have been killed by accidents if the 1913 accident death rate had continued unabated. He also said it is a great satisfaction to know that passengers are still safer in steam railway trains than when using any other vehicle of transportation. "Our national accidental death rate," he continued, "is still entirely too high, higher in fact than the rates for 22 of the 23 foreign countries for which we have comparable records. Chile is the only one of the 23 countries which has a worse record than ours.

"Accidents will stop only when each individual accepts his personal responsibility for our accident toll.

We will never have adequate protection for human life until the manufacturer insists on safeguarding every machine before it is offered for sale; until the employer insists on safe equipment and safe methods of performing every job; until the worker makes safe practices a part of his sub-conscious habit; and until the motor car driver becomes as courteous as he is in his home or office."

Report of Committee on Trespassing

The report of the Committee on Trespassing, of which Robert Scott, director of the department of insurance and safety of the Atlantic Coast Line, is chairman, showed that while trespassing is decreasing, there is still room for improvement. During the period from 1901 to 1910, 50,025 persons were killed and 53,427 were injured, while during the period from 1925 to 1934, the number had been reduced to 24,951 killed and 30,200 injured. These reductions, according to the committee, were a result of (a) safety education in the schools, promoted to a great extent through activities of the railroad safety departments; (b) protective measures adopted by railroad police departments; and (c) introduction of other modes of transportation brought about by improved highways and the practice of hitch-hiking.

The general discussion of the report advocated a continuation of efforts to reduce trespassing since 50 per cent of all persons killed are trespassers whose claims are usually large. It was also recommended that the Safety section co-operate closely with the Protective section, the members of which are in a position to police railroad property and aid in the elimination of trespassing.

Report of Committee on Train Accidents

The report of the Committee on Train Accidents, as presented by C. H. Longman, assistant to the vice-president and general manager of the Chicago & North Western, showed that during 1934 there were 6,023 train accidents, resulting in 256 persons being killed and 1,000 being injured, while during 1933, there were but 5,623 train accidents, resulting in 218 persons killed and 1,365 injured. However, in 1934 there were only 12 passengers killed on trains, while in 1933 there were 23, a decrease of 11. Further, there were only 394 passengers injured on trains in 1934, as compared with 657 during 1933.

Constant checking by general officers, transportation inspectors, safety men and division officers to see that rules pertaining to train orders are being complied with should practically eliminate all accidents resulting from the mishandling of train orders, according to the report.

Another predominating cause of train accidents cited is the failure of enginemen to observe properly and comply with signal indications and stop signals from flagmen. The report recommended continued surprise checks to insure compliance with the rule which provides that enginemen must communicate to each other, by its name, the indication of all signals affecting the movement of their train. "When we speak of a train accident caused by excessive speed," the report continued, "we should not always feel that the engineman is responsible until we know all of the facts, as many investigations of derailments have developed that the condition of the track was not such as to permit of the authorized speed.

"While it is true we have had a few accidents last year due to washouts and some this year, I believe that the railroads, as a whole, have worked up necessary instructions and have made an effort to see that such instructions have been complied with, and that this has gone a long way toward preventing derailments due to that cause. I believe that during this year so far there have

been more washouts on railroads than in any of the previous 10 years; yet there were very few derailments. Striking automobiles and trucks at crossings is increasing our train accidents and I personally think that one of the ways to reduce accidents of this kind is by having strongly-built pilots on our engines.

"We all have rules and instructions on our railroads which, if complied with, would practically eliminate all of the train accidents mentioned, and it is part of the safety man's business to see that these rules and special instructions are complied with. If you will make observations and checks you will find that there are important rules that are not being enforced."

Report of Committee on Train Service Accidents

The report of the Committee on Train Service accidents, of which Charles E. Hill, general safety agent of the New York Central, is chairman, showed that of the total number of employee casualties resulting from accidents in all classes of railroad service, train service accidents caused 63 per cent of the deaths and 38 per cent of the injuries. In all classes of accidents in 1934, 526 employees were killed and 16,990 were injured, the number of trainmen being 281 killed and 6,216 injured. Of the 312 employees killed in train service accidents, 187 were trainmen and of the 6,340 employees injured, 5,770 were trainmen. The committee, in presenting the statistics for each class of accident, also offered suggestions which, if carried out fully, will result in marked decreases in the number of deaths and injuries which, in 90 per cent of the cases, are due to man failure.

In the discussion of this report, D. G. Phillips, superintendent of safety of the Wabash, said that the casualties due to being struck or run over by locomotives or cars were caused by persons walking or standing on tracks, walking or standing too close to tracks and getting on or off locomotives or cars, and that the remedy is for persons to look both ways when on or near tracks.

C. L. LaFountaine, general safety supervisor of the Great Northern, discussed the six persons killed this year while getting on or off locomotives or cars and operating handbrakes. Of these, two fell from locomotive tanks, two fell from gangways, one fell from a running board and one exposed his body from a cab. He emphasized the necessity for keeping employees off running boards and out of gangways and said the safest way to mount tanks is to descend to the ground and then climb the rear of the tank.

Report of Committee on the Prevention of Highway Crossing Accidents

The Committee on the Prevention of Highway Crossing Accidents, of which H. A. Rowe, manager of the claims department of the Delaware, Lackawanna & Western, is chairman, reported an increase of 1,672 accidents in 1934, as compared with 1928. In 1934, 1,554 persons were killed and 4,300 were injured, the 24,933,403 automobiles registered averaging 16,019 per death and 5,794 per injury. The committee recommended that individual railroads stress the necessity for giving adequate and timely warning to the public of the approach of trains, that the standards of protection established by the Joint Committee on Grade Crossing Protection be employed where necessary at crossings to facilitate uniformity and public understanding of the signals, that crossings be periodically inspected and maintained in sound, travelable condition with all obstructions to the view removed wherever practicable and that advantage be taken of the opportunity to address students on the subject of crossing safety.

In the general discussion of the report, emphasis was

placed on the necessity for closing unnecessary grade crossings and for curtailing the opening of more crossings if the program of grade crossing elimination is to be very effective in reducing accidents. It was also noted that 81 per cent of the crossing accidents occur during the dark hours of the day and that 85 per cent of the accidents involve passenger automobiles. The states which have the poorest record are Illinois with 40 deaths, Indiana with 28, Ohio with 22, Texas with 20 and California with 18. A six-year study made by the New York Central shows that where flashing light signals are employed, there was an average of 1 accident for every 18 crossings so protected, while where watchmen were on duty, there was 1 accident for every 20 crossings and where gates were installed, there was 1 accident for every 24 crossings.

Report of Committee on Non-Train Accidents

The Committee on Non-Train Accidents, of which E. B. Perry, assistant to the general manager of the New York, New Haven & Hartford, is chairman, presented a group of charts showing the downward trend in non-train accidents from 1926 to 1933. The report incorporated the composite methods and practices followed by 15 railroads whose efforts had aided in reducing accidents. The report stressed the importance of the observance of rules, the need for the right sort of supervision, the means and methods of dealing with non-train service accidents and particularly the five specific causes most frequent in the sum total within this group.

In the discussion of this report, J. R. Tenney, supervisor of safety of the Western Maryland, said, "Non-train accidents, as a group, took a sharp turn downward during the eight-year period, but the proportion of accidents due to collapse and fall of objects, in relation to all non-train accidents dropped slightly within the whole group, while over the same period the ratio of accidents due to falls of persons increased over seven per cent within the group.

"What invites comment is the fact that where better tools and equipment are involved, as in the prevention of accidents due to the collapse and fall of objects, the trend has been downward faster than the non-train accidents as a whole, whereas in accidents due to causes under the control of the workmen, that is, falls of persons, the downward trend has lagged behind the downward rate of all non-train accidents. Experienced safety men have pointed out that the education and training of both the supervision and the men is more than 90 per cent of the job. This leads to the inevitable conclusion that there should exist an authoritative comprehensive text book on that subject.

"Year after year accident prevention tends more toward a standardized exact science. Safety instruction and practices in some directions become well nigh universal on the railroads of the country. To make this personal and necessary education and instruction completely uniform and effective and to take full advantage of everything that has been successfully applied on individual railroads, past experience should be codified and published in a standard safety code. This code should be authoritative and all inclusive, so that it will rank in importance with the Standard Code of Operating Rules."

S. L. Witman, supervisor of safety of the Reading, in his discussion of the report, recommended that notes covering the trial and study of the committee's suggestions be forwarded by each safety supervisor to the Non-train Accident committee for its information and further study. H. R. Cole, assistant to the vice-president of the Erie, directed his remarks to the use of hand tools and apparatus.

Freight Car Loading At New Peak

WASHINGTON, D. C.

REVENUE freight car loading in the week ended October 12 totaled 734,274 cars, an increase of 27,397 cars as compared with the week before and of 97,275 cars, or 15.3 per cent, as compared with the corresponding week of last year. This not only represented a new peak for this year to date but was also the greatest total for any week since 1931. All districts and all commodity classifications except live stock showed increases as compared with last year but merchandise, grain, and ore showed decreases as compared with the preceding week. The largest increase over last year was that in loading of miscellaneous freight, which showed a gain of 40,586 cars, while coal loading showed an increase of 27,402 cars. The cumulative total for the year, 24,579,569 cars, is now nearly up to that for last year, 24,631,857 cars. The summary, as compiled by the Car Service Division of the Association of American Railroads follows:

Revenue Freight Car Loading			
For Week Ended Saturday, October 12			
Districts	1935	1934	1933
Eastern	152,449	130,559	139,805
Allegheny	133,420	111,827	125,174
Pocahontas	53,530	44,768	46,827
Southern	101,696	86,430	91,308
Northwestern	116,703	95,575	99,687
Central Western	116,896	111,167	112,599
Southwestern	59,580	56,673	55,280
Total Western Districts.....	293,179	263,415	267,566
Total All Roads.....	734,274	636,999	670,680
Commodities			
Grain and Grain Products.....	37,014	30,633	28,829
Live Stock	22,730	31,508	24,555
Coal	147,914	120,512	130,956
Coke	8,277	5,373	7,037
Forest Products	32,404	21,922	25,087
Ore	32,532	17,938	33,799
Merchandise L.C.L.	165,999	162,295	172,080
Miscellaneous	287,404	246,818	248,337
October 12	734,274	636,999	670,680
October 5	706,877	632,406	662,373
September 28	630,771	646,084	669,186
September 21	707,644	644,498	659,866
September 14	700,357	647,485	660,086
Cumulative Total, 41 Weeks.....	24,579,569	24,631,857	22,947,733

The freight car surplus for the last half of September averaged 228,520 cars, an increase of 344 cars as compared with the first half of the month. The total included 132,886 box cars, 58,852 coal cars, 18,963 stock cars, and 7,691 refrigerator cars.

Car Loading in Canada

Car loadings in Canada for the week ended October 12 totaled 58,571, as compared with 58,364 for the previous week and 51,560 cars for the corresponding week last year, according to the compilation of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
October 12, 1935.....	58,571	22,049
October 5, 1935.....	58,364	22,962
September 28, 1935.....	55,766	22,102
October 13, 1934.....	51,560	18,790
Cumulative Totals for Canada:		
October 12, 1935.....	1,833,683	868,786
October 13, 1934.....	1,803,820	886,592
October 14, 1933.....	1,554,923	752,913



Bridge and Building Association



Holds Successful Meeting

Sustained interest in program characterizes the forty-second convention of this organization

Part I

WITH a program that embraced seven committee reports, eight addresses and a round-table discussion, all bearing on their daily problems, the forty-second convention of the American Railway Bridge and Building Association, which was held in the Hotel Stevens, Chicago, on October 15-17, was of intensely practical value to the 175 railway officers in attendance. That the interest in these reports and addresses, which covered many phases of the bridge and building supervisory officer's work, was sustained throughout the meeting, was indicated by the full attendance at the five sessions and by the lively discussions which followed their presentation. The exhibit of the Bridge and Building Supply Men's Association, the largest and most complete exhibit of materials and equipment pertaining to bridges, buildings and water supply, received close attention and elicited many commendations.

The convention was opened with an address by Harry G. Taylor, chairman, Western Association of Railway Executives, followed by greetings from the American Railway Engineering Association, by R. H. Ford, president, and assistant chief engineer of the Chicago, Rock Island & Pacific, and from the Roadmasters and Maintenance of Way Association of America, by Armstrong Chinn, president, and chief engineer of the Alton. Others addressing the convention included A. R. Wilson, engineer bridges and buildings, Eastern region, Pennsylvania, on Recent Developments in the Application of Welding to Railway Bridges, C. Earl Webb, division engineer, American Bridge Company, Chicago, on Trends in Bridge Design, Erection and Maintenance, and I. L. Simmons, bridge engineer, Chicago, Rock Island & Pacific, Chicago, on How to Make Pile Bridges Last Longer. In addition, a paper prepared by George W. Rear, engineer bridges, Southern Pacific, described the San Francisco Bay bridge now under construction between San Francisco, Cal., and Oakland. H. I. Benjamin, vice-president system committee on insurance, Southern Pacific, presided over the convention as president, assisted by C. A. Lichty, secretary.

Election of Officers

At the annual election at the closing session the following officers were elected for the ensuing year: President, T. H. Strate, division engineer, C. M. St. P. & P., Chicago; first vice-president, E. C. Neville, master bridges and buildings, C. N. R., Toronto, Ont.; second vice-president, C. M. Burpee, research engineer, D. & H., Albany, N. Y.; third vice-president, F. H. Masters, as-

sistant chief engineer, E. J. & E., Joliet, Ill.; fourth vice-president, C. A. J. Richards, master carpenter, Penna., Chicago; secretary-treasurer, C. A. Lichty, re-elected; members executive committee, W. R. Roof, bridge engineer, C. G. W., Chicago; T. P. Soule, general supervisor bridges and buildings, N. Y. C., New York; F. H. Cramer, assistant engineer bridges, C. B. & Q., Chicago. Chicago was selected as the convention city for 1936.

Address of H. G. Taylor

Harry G. Taylor, chairman, Western Association of Railway Executives, Chicago, opened the convention with an address in which he reviewed the developments of the last year. Many problems have arisen to tax the resources of the railroads, he said. During the last year, one road had lines tied up at the same time by a snow blockade, dust storms and a washout, all within 300 miles. Another road had more than 200 washouts on its lines within a few weeks last spring, while washouts caused losses exceeding \$2,500,000 on still another railway. These illustrated the diversity and the magnitude of the problems confronting maintenance of way officers and especially those in bridge and building work. Notwithstanding this unparalleled destruction, he said, the morale of railway officers has been unbroken, with the result that service was restored in record time, long before the highways in the same area were returned to service, many of them, in fact, being still out.

In spite of physical and financial difficulties, Mr. Taylor said, railway men are still looking forward. They still have faith in their industry. Railway men of past generations dared to risk colossal failure and won. This spirit of determination persists, in the belief that the public will eventually give to the railways that co-operation and assistance that they need in order to render most efficient service.

Mr. Taylor concluded with a reference to the origin of the Constitution of the United States and the emphasis which it placed on individual initiative and individual welfare. Under this Constitution, he said, we have built a country to which all the world looks with admiration. If we are true to the traditions of the past, we need have no fear of the future, he concluded.

Robert H. Ford Speaks

Robert H. Ford, president of the American Railway Engineering Association and chairman of the Engineering division, A.A.R., extended greetings on behalf of the association whose activities he is directing. Mr. Ford

dwelt particularly on the necessity for co-ordination of the activities of the various associations in the engineering field in order that they may make a united attack on the problems confronting the railways. He reported that the Association of American Railroads had appointed a committee to survey and recommend co-ordination of the activities of these organizations.

Mr. Ford elaborated especially on the necessity for aggressive prosecution of research activities, stating that request is now being made for an appropriation approximating \$1,000,000 for the next year. Methods are changing in all industries. Obsolescence and inadequacy are never-ending. The average life of the passenger stations of Chicago, he said, is only 35 years. Engineering research and study are needed if the railways are to keep pace with these changing conditions. Only through co-ordinated leadership of the 15,000 engineering and maintenance of way officers of the railways can adequate progress be made. The most pressing problem confronting the railways today is the development of new methods. Do not fear to investigate new ideas, he said, no matter how visionary they may appear, for some of the ideas that appear most visionary at first prove of unquestioned merit.

A. Chinn Brings Greetings

Armstrong Chinn, chief engineer of the Alton and president of the Roadmasters and Maintenance of Way Association, brought greetings from the latter organization. These are strenuous times, he said, for the men responsible for the maintenance of our railroads. In the fact of decreased earnings and lowered maintenance allotments, they are asked to maintain roadways that will carry safely and comfortably trains operating on the fastest schedules in the history of American railroading. That they are doing so splendidly is a fine tribute to their loyalty and to the zeal with which they are searching out ways and means of accomplishing their task. A great deal is heard these days of streamlined trains, fast schedules and record runs, but very little of the men responsible for building and maintaining the structures that make these records possible. Much of the credit for these accomplishments belongs to the members of associations like these who, largely through study and the exchange of ideas in association work, are able to maintain these new standards with the limited funds allotted to them.

A Call to Action

President Benjamin reviewed the activities of the association during the last year, after which he discussed the broader problems of the railways and the part which railway men should take in their solution, in part as follows:

The last five years, although trying ones, have brought about changes in methods and in service which are continuously creating new problems. These problems will continue to arise as the railroads move forward. It is our duty to study and to report upon those problems pertaining to our line of work and to be helpful to one another in solving them.

We have learned much during the last five years of ways to prolong the life of many of our structures. The reduction in expenditures for maintenance work for which bridge and building men are responsible from \$130,849,000 in 1930, the last normal year of railroad operation, to \$57,770,000 in 1933, means that the time is rapidly approaching when heavy maintenance work will be necessary if the properties are to be restored to their

pre-depression condition. We should be prepared to do this work and should be formulating plans and methods which will give the most economical results.

The railroad industry in the United States represents a capital investment of about \$26,000,000,000. Fast and economical service must be and has been maintained. Rolling stock and locomotives must be purchased and large sums must be expended for air conditioning of passenger equipment, for new high-speed stream-lined passenger trains and for other improvements. Where is this money coming from? To secure this capital the plant must earn a fair return or it will be impossible to proceed far with any of these activities. All the railways are asking is an even break, that in competition with other carriers they be given equal treatment under the law, that they be not taxed to provide assistance to competing carriers of transportation, that this taxation be on a more equitable basis, and that the subsidizing of other forms of transportation be withdrawn.

Government ownership of railroads is considered by some as a solution to the problem. But what would this solution involve? Will state and local communities be satisfied in having their incomes reduced by the \$1,000,000 per day that the railroads pay in taxes, without forcing other industries and individuals to make up this loss?

Private enterprise survives by the results which are obtained, while government enterprise survives through taxation. A government owned or operated railroad has seldom developed an improvement. Compare this with the initiative of privately owned railroads that is developing the high speed train, that is improving refrigerator service, that is establishing store-door pick-up and delivery service. No, government ownership, no matter how widely it may be advocated by the unthinking man, will not solve the problem.

Members of this association may well ask what they, as citizens and as railroad men, can do to put on its feet once more the largest and most necessary industry in the country. One million railroad men, scattered in every nook and cranny of our country, not only control many votes but have much influence in their communities. Railroad men must pull together, for as the railroads prosper, so does the railway employee prosper.

Being in supervisory positions, bridge and building men travel over their territories frequently. On these travels they eat at many restaurants and spend their nights at many hotels. Their patronage is wanted by the restaurant man, by the hotel keeper, by the butcher, the baker and the local merchant. Would you sit idly by and let a trestle burn, if you could save it by a little effort on your part? Do you, as railroad men, want government ownership with its spoils system and its politics? Many of you have come up from the ranks and appreciate that your promotion has been due to ability.

It is unfortunate that there is so little opportunity for a systematic educational campaign to put the railroads' side of the picture before the public. This is your duty. Get acquainted with your elected representatives, county, state and federal. Get acquainted with the public with whom you come in contact. Show them that your prosperity is their prosperity, for when the pocket book is hurt, it is deeply felt. You can do a world of good and your officers will give you every help possible. If you had a washout or a burnout to repair, you would know what to do. The present crisis is as serious in its way as any interruption of traffic you will ever have to remedy.

Many of you may say that it cannot be done. I say it has been done and can be done again. Dangerous legislation has been killed by active work on the part of railroad men and what has once been done can be repeated.

You have a job to perform. You have never failed in an emergency and I cannot see how you can fail in this if you realize the seriousness of what is taking place.

Leadership

Approximately 175 railway and railway supply men, including a number of leading operating executive officers, gathered at a luncheon on Wednesday noon, at which George D. Brooke, operating vice-president of the Chesapeake & Ohio-New York, Chicago & St. Louis, spoke on the importance of leadership in these days, in part as follows:

The maintenance organizations of our American railroads are made up of a fine body of men. They take great pride in building and maintaining smooth, neat track and strong, safe bridges, substantial buildings, efficient signals and water stations. They are ready to work long hours when necessary and to exercise unceasing vigilance to promote the safety and continuous operation of the railroad. They are ever willing to go out in storms and rough weather to look for washouts, land slides and other interruptions to train movement and to meet emergencies when they come with energetic action. Bridge and building men especially seem to glory in emergency jobs, in working under high pressure to rebuild trestles, to crib up track on washed embankments, to rebuild important buildings and to meet emergency situations quickly and efficiently.

The problems of railroad management have been particularly serious and pressing during the last few years. Earnings have been far from adequate to meet actual needs. It has been necessary to make the available resources go just as far as practicable and funds for maintenance work have accordingly been curtailed. In circumstances of this kind, maintenance officers can handle their work most successfully and can be most useful to the railroads which they serve by having a sympathetic understanding of the point of view of the management and meeting their problems and planning the work from that viewpoint. Of greatest importance, of course, in situations of this kind, is the guarding against unsafe conditions, and the repair of structures to prevent them from becoming unsafe. On the other hand, it may be found that structures which under normal conditions would be renewed, can, by careful watching, be continued in service. Electric welding is a great aid in repairing defective details of steel structures and through its use the strength of important members can be so increased as to prolong the usefulness of a structure indefinitely. Frequent and careful inspections are doubly important under such circumstances and bridge and building supervisors should not depend entirely upon others for this essential work, but should make periodic inspections with a frequency that will insure a reliable personal knowledge of the bridges and structures which require this careful watching.

Next in importance are those conditions which, if permitted to continue, will ultimately result either in the structure becoming unsafe or in heavy expenditures for renewals. The protection of steel structures from corrosion is an outstanding example of this. Unprotected steel, where subject to the action of locomotive stack gases, will deteriorate with alarming rapidity. Spot painting can be done to good advantage, but when full painting is really needed it should not be deferred.

With the advent of the better times to which we all look forward, funds for maintenance purposes will be more liberal, but you will still have interesting problems. You will find it important to utilize methods and ma-

terials which will reduce future maintenance costs to the minimum. The use of treated timbers, of better grades of paints with increased life for metal protection, the framing of bridge timbers before treatment have advantages which I am sure you all realize. In clearing up any bad situation, as for example, one resulting from deferred maintenance, I have found it advisable to correct first that condition which is most troublesome and the remedying of which will give the greatest returns in operating economies or in the reduction of current maintenance expenditures, so as to release funds for other maintenance needs. The correction of the next most difficult condition should then be undertaken and so on in order. The results of this method of attack will be surprisingly gratifying and comforting.

We are in the midst of a period of transition in the transportation industry. Efficient motor vehicles on improved highways provided by national and state governments, waterways also provided by a beneficent government, and airways have cut heavily into railroad transportation. The problem of the railways in these circumstances is to adapt themselves to the changed conditions.

You are the leaders and directors of the railway bridge and building men of our country. Most of you have risen from the ranks of bridge and building gangs. You are proud of the traditions of these men and are anxious that they continue to be lived up to. Your position of leadership gives you great opportunities to foster this spirit and to develop future leaders to follow in your footsteps and to build even better than you.

Welding Railway Bridges

In an address on Recent developments in the Application of Welding to Railway Bridges, A. R. Wilson, engineer of bridges and buildings of the Eastern Region of the Pennsylvania, presented the attitude of the practical bridge engineer regarding this new development. It has been difficult, Mr. Wilson said, to overcome the natural prejudice that always exists against a comparatively new method of construction. With welding, this prejudice is greater because of the unsatisfactory results that were obtained before welding processes were placed under engineering control.

The main obstacles that welding had to overcome in the early stages of its development were to prove that the deposited metal was sound and of good physical properties and that the work of welders could be relied upon. Ample reassurance on both of these points has now been furnished, an outstanding contribution being the 1931 report of the Structural Steel Welding committee of the American Bureau of Welding.

Welded bridge construction may be considered historically to date from 1922, when some small experimental structures were built in Belgium. The first important bridges fabricated by welding in the United States were constructed in 1927 by the Westinghouse Company for railroad service on its own lines. Since that time, and up to the present year, no important all-welded bridge structures have been erected in this country. During the past summer the American Bridge Company completed at Delanco, N. J., an all-welded highway drawbridge, with fixed approach spans, with a total length of 400 ft., and a total tonnage of 450, and requiring 24,000 lin. ft. of welding.

In Europe, Poland, Czecho-Slovakia and Belgium have led the way in early all-welded bridges, being followed by the other countries; at the present time Germany and Belgium are the most active. In Germany

alone it is reported that the State Railways will have 100 welded plate-girder bridges in service this year; likewise Germany has been the greatest contributor to engineering research, all of the interests in that country—the railways, shipyards, government and the university laboratories having combined to attack these problems by co-ordinated research with fruitful results.

Welding introduces special problems of its own in bridge construction as compared with buildings, in that bridges involve more varied forms and sizes of structures and necessitate more detailed design, the most important difference being that bridges must carry repeated and impact loads which occur only to a subordinate degree in buildings. I would be surprised if among the present generation of railway bridge engineers, there would be one who would have the temerity to design and build an all-welded bridge to carry railroad loads, although there are now in the course of preparation, by a committee sponsored by the American Welding Society, specifications covering the design and fabrication for all-welded bridges, both railroad and highway.

The problem of maintenance is one that should be uppermost in the minds of the bridge engineer, both in the design of new structures and in prolonging the life of existing structures. The effects of corrosion and the increase in the weight of equipment are two of his greatest nightmares, and when he is confronted with a structure, only part of whose useful life has expired, he must by some method repair or strengthen it so that it may be continued in service.

Welding will not solve all of our problems, but many do arise where no other method is so well adapted, and I am convinced that by welding, repairs and strengthening can be done both safely and economically. Welding derives its advantage over riveting in the reinforcement of old structures from the fact that it provides a means of attaching new metal without the use of rivets or bolts. Welding obviates the temporary weakening of members sometimes caused by removing rivets or drilling new holes, and thus avoids delays to train service by reason of slow orders or temporary interruptions of traffic. This makes it possible to carry on reinforcing work of a character that would not be attempted by riveting, because of the expensive dismantling or falsework that would be required.

How to Make Pile Bridges Last Longer

I. L. Simmons, bridge engineer of the Chicago, Rock Island & Pacific, incorporated in a paper a number of practical suggestions designed to meet the conditions confronting the bridge engineer today, which are abstracted below. We have now passed through five years without any major renewals, Mr. Simmons said, and the end is not yet in sight. The question uppermost in our mind is "What can we do to carry our structures longer, economically if possible?"

To determine the amount of work necessary it is mandatory that a thorough inspection be made of each structure by the properly designated officers, and a careful record made of the amounts and kinds of material required to carry the structures in a safe condition. This inspection and record should be made in such detail that, in the event of complete renewal, the amounts and kinds of serviceable material released will be available for use in formulating a division program of repairs to various kinds of structures.

I believe that second-hand material released should be

used, so far as possible, in repairing such structures as loading platforms, coal chutes, etc., where the maintenance of the facility alone is the major consideration. Such new material as is bought should be used in structures where both the physical property and human life are involved.

In making the inspection, safety of operation should be the motto in determining the amount of work to be done, and economy the yardstick in determining how it should be done. After the inspection is made and the amount of material available for reuse and its suitability for repairs determined, one can decide the number of bridges which should be renewed entirely in order to furnish the necessary repair material for the remainder of the structures.

In selecting material for repairs, one must consider not only the work the material has to perform, but also the general condition and probable life of the remainder of the structure. It is manifestly poor policy to insert a timber that has a remaining life of only four years in a structure which has a remaining life of six to eight years. It may answer the requirements of safety but not of economy. The life of the structure must be kept constantly in mind, and such repairs as are made should be made so thoroughly that it will be unnecessary to send a bridge crew to the structure again for that purpose.

I wish to emphasize particularly the importance of programming and organizing work. Avoid running a pile driver over a district for a scattered pile here and there. Where permissible, use the post method. Select your complete renewals as close together as possible and do all your driving at one time. Avoid moving your crews back and forth; make progress in one direction. Traveling causes loss of time and money. Study your work.

(Abstracts of the reports presented by the various committees will appear in the next issue.)

New Haven Files Under Bankruptcy Act

THE Interstate Commerce Commission on October 22 refused to approve a further loan of \$5,000,000 from the Reconstruction Finance Corporation to the New York, New Haven & Hartford and on the following day the company filed a petition under Section 77 of the revised Bankruptcy Act in the United States district court for Connecticut. The company sought the loan in order to pay taxes totaling \$5,009,100, due between October 10 and the end of the year, and equipment trust installments totaling \$442,000. The company has outstanding \$16,275,000 of bank loans and is indebted to the Reconstruction Finance Corporation in the amount of \$7,699,778, to the Railroad Credit Corporation for \$3,428,225, and to the Public Works Administration for contracts for loans of \$7,100,000, of which \$6,777,000 has actually been advanced. The company was unable to obtain the funds needed from any source other than the Reconstruction Finance Corporation and, when permission to borrow from this body was refused, no alternative was left but to seek the aid of the court.

According to the management's estimates, cash receipts for the year will total \$108,961,000 and disbursements will, if all obligations are met, total \$116,331,000—leaving a net income deficit of \$7,370,000, with a net

(Continued on page 549)

Motor Transport Section



The Pacific Greyhound Lines Averages 276 Miles Per Assigned Bus Per Day

Getting the Most Out of Buses

Pacific Greyhound Lines makes special effort to increase utilization of motor coaches

UNTIL the present, at least, the rapid improvements in motor coach design have been such that much equipment is outmoded long before it is outworn. A bus is out of date from the standpoint of comfort and design in five years at the most, or long before it has ceased to be an efficient transportation unit so far as its motor and other strictly utilitarian qualities are concerned. In other words, it is practically impossible completely to exhaust the mileage potentiality of a bus before it must be retired for reasons other than being worn out.

At the end of the period when it may be rated as a modern coach, it may, of course, be relegated to shorter or less important runs. Apart from the fact, however, that bus passengers have been educated beyond the point where they will accept archaic equipment on any run, this also represents an economic loss if the unit has used only a small part of its potential mileage in long distance service.

With this in mind, the officers of the Pacific Greyhound Lines have been exerting every effort to secure the maximum utilization of their buses from the time when they are put in service. The measure of their success in this regard is indicated by the fact that, whereas in August, 1931, all P.G.L. buses were averaging 147 miles per day, and assigned buses 175 miles per day, the present figures are 226 miles per day for all buses, and 276 miles per day for assigned buses.

Credit for this showing, whereby bus utilization was

increased by nearly 100 miles per bus per day, is due, of course, to improved equipment and improved maintenance facilities and methods, which have materially reduced the standby time of buses undergoing or awaiting repairs. A large measure of the credit, however, is due to changes in operating methods, such as through buses on the long runs, pooling of buses on local runs and the use of buses on both through and local runs where the schedules permit.

For supervisory operating purposes, the routes of the Pacific Greyhound Lines are allocated into seven separate divisions, under a general manager with headquarters in San Francisco. Each division is under the supervision of a superintendent, with headquarters as follows:

Division	Headquarters
Oregon	Portland
Redwood Highway	Santa Rosa, Cal.
Oakland	Oakland, Cal.
Coast	San Francisco, Cal.
Los Angeles	Los Angeles, Cal.
Phoenix	Phoenix, Ariz.
El Paso	El Paso, Tex.

A general superintendent of maintenance and equipment, with headquarters at San Francisco, is in charge of maintenance and the assignment of equipment and is constantly working out plans whereby bus utilization may be increased.

The longest runs made by P.G.L. buses are between San Francisco and Portland, San Francisco and Salt Lake City, Los Angeles and Albuquerque, and the four

different routes between Los Angeles and El Paso. There are, in addition, the "nitecoach" runs, one between San Francisco and Los Angeles, the other between Los Angeles and Kansas City, in connection with other Greyhound Lines. These, however, must be considered, for the present, at least, as specialized runs, although the latter route, on which sleeper service has just been started, will undoubtedly add to the average miles per bus per day.

Of these long runs, that between San Francisco and Portland was originally operated with two bus changes, the runs being as follows: San Francisco-Medford, Medford-Portland; but, at present, the through run of 722 miles is being made without change.

The San Francisco-Salt Lake City run, 767 miles, was formerly made with a bus change at Reno. This has been eliminated and buses now operate through.

Between Los Angeles and El Paso, bus changes were formerly made at El Centro, Cal., Phoenix, Ariz., and Lordsburg, N. M. Today, buses are operated through on each of the four routes, ranging from 835 to 1,007 miles between terminals. The Los Angeles-Albuquerque run was being operated as a through run when it was acquired by the P.G.L. a few years ago, and it is still operated in the same manner. In addition to the other benefits gained by such through operations, the convenience of the passenger is much increased and baggage handling is simplified.

The runs between San Francisco and Los Angeles are divided into two pools, the Valley pool and the Coast pool, depending upon the routes used. In each case where schedules permit, they are operated over local runs during what would otherwise be dead layover time. Thus, in addition to making more daily mileage, they provide for operating these local runs with the latest modern equipment that would otherwise be confined to through-run service.

Pooling equipment on local runs has also been a fruitful source of increasing bus utilization. From three to five buses are used in these pools, following one another over the various routes.

The example of a four-day, four-bus pool in the vicinity of San Francisco is typical of many such pools and will illustrate the manner in which they are operated to provide service on several short runs, and, at the same time, provide for increased bus mileage.

<i>First Day—107 Miles</i>		
Lv. San Francisco	9:50 a.m.	
Ar. Modesto	1:28 p.m.	

<i>Second Day—338 Miles</i>		
Lv. Modesto	7:15 a.m.	
Ar. San Francisco	10:55 a.m.	
Lv. San Francisco	1:05 p.m.	
Ar. Sacramento	6:40 p.m.	
Lv. Sacramento	8:05 p.m.	
Ar. Davis Junction	8:25 p.m.	
Lv. Davis Junction	8:48 p.m.	
Ar. Modesto	11:55 p.m.	

<i>Third Day—176 Miles</i>		
Lv. Modesto	8:43 a.m.	
Ar. San Francisco	12:30 p.m.	
Lv. San Francisco	6:05 p.m.	
Ar. Stockton	9:30 p.m.	

<i>Fourth Day—108 Miles</i>		
Lv. Stockton	7:33 a.m.	
Ar. San Joaquin Bridge	7:55 a.m.	
Lv. San Joaquin Bridge	9:20 a.m.	
Ar. Stockton	9:55 a.m.	
Lv. Stockton	12:55 p.m.	
Ar. San Francisco	4:40 p.m.	

It will be observed that this pool has the effect of keeping the buses in operation a considerable part of each

day, while they are averaging 182 miles per day, instead of using more buses for only a few hours each, at less than 100 miles per day, as was the case before this pool was put into operation.

By taking advantage of every opportunity for increased utilization, the Pacific Greyhound Lines has lowered its costs and provided better equipment for many more runs.

I.C.C. Begins Motor Carrier Regulation

FEDERAL regulation of interstate bus and truck transportation under the new motor carrier act entered upon its first stages this month when the law became technically effective on October 1 and the Interstate Commerce Commission obtained temporary allotment of funds for the purpose of its administration. The commission was thus enabled to fill the key positions in the organization of its Bureau of Motor Carriers, although the organization of 16 district offices is yet to be completed, and the first evidence of its activities was available shortly before October 15 when it began mailing to some 200,000 bus and truck operators the forms on which applications are to be filed within 120 days from that date for certificates of public convenience and necessity for common carriers, permits for contract carriers and licenses for transportation brokers.

Funds Finally Obtained

Handicapped by the failure of the bill which would have appropriated \$1,250,000 for the administration of the law, the commission finally succeeded by October 1 in obtaining approval of the Budget Bureau for an arrangement by which it will draw \$525,000 from its general appropriation until February 1, by which time Congress will have had an opportunity to make a regular appropriation for the motor carrier work, but the delay made it necessary for the commission, as authorized by the statute, to postpone the effective date of several of its most important sections. Those pertaining to the filing of tariffs and similar matters were postponed until December 1 and those relating to the filing of applications until October 15, as the preparation of the necessary forms, calling for voluminous information from those seeking authority under the "grandfather clause" to continue their present operations, was not completed until a few days before that time. Many conferences with representatives of the motor carriers were necessary before these forms were finally put into satisfactory shape, and the railroad lawyers also took an interest in the matter in an effort to make certain that all necessary information as to the status of existing operators should be called for.

An idea of the spirit in which the commission is approaching the problems laid before it by the passage of the motor carrier act has been given in several addresses during the past two weeks by Commissioner Joseph B. Eastman, who is chairman of the commission's Division 5 which is to have particular charge of the administration of the law. A large part of his address at the annual convention of the American Trucking Association, Inc., at Chicago on October 14, was published in last week's issue. He also led the discussion of the subject at the convention of the National Association of Railroad and Utilities Commissioners at Nashville, Tenn.

Motor Carrier Act Will Bring Big Changes in I. C. C.

Personnel will probably be more than doubled, rate basis changed and classifications simplified

By F. J. Lisman

IN its most important aspects, that is, in the supervision of rates, the status of the Interstate Commerce Commission toward the railroads has been almost completely changed by the Highway Carrier Act. This is altogether the most important and complex job yet wished on the Commission and one which will have many reactions and repercussions for years to come. In the long run, it is going to benefit both the carriers by rail and highway, but those who look for resulting increased net earnings at an early date, are bound to be disappointed.

Heretofore it has been the duty of the I.C.C. to regulate the railroads and to be helpful to them in securing business and reasonable net earnings. The new act declares it to be the policy of Congress "to regulate transportation by motor carriers in such manner as to recognize and preserve the inherent advantage of, and foster the sound economic conditions in, such transportation and among such carriers in the public interest; . . . improve the relations between and coordinate transportation by and regulation of motor carriers and other carriers; . . ."

Heretofore, whenever railroads asked for permission to reduce rates to meet motor competition, the permission was generally granted; hereafter the Commission may not grant such requests without considering the effect on the net earnings of both types of carriers. The act further gives to the Commission authority to regulate the hours of labor; safety of vehicles, etc.

There are now somewhat under 1,000 active railroad companies, large and small, under the supervision of the I.C.C. There are at present upwards of 100,000 separate carriers by highway operating an average of around 3 vehicles each. It is estimated that three trucks out of four carry intra-state traffic, not yet subject to the regulation of the I.C.C., and probably nine buses out of ten also do a strictly intra-state business. Until the Commission either obtains authority over intra-state traffic—if that be constitutionally possible—or until the states cooperate fully the full benefits of the act cannot be attained. No doubt before long most of the states, at the behest of public opinion, will accept such safety regulations as the I.C.C. will prescribe for vehicles in interstate commerce and they may also at the behest of the labor unions accept the Commission's regulations as to hours of service. Such reasonable regulation is badly needed because the hours of labor as well as wages of truck operators in many cases are quite pitiful.

Whether other abuses, such as rebating, rate cutting, etc., will be checked by the states is quite another question; but, it is certainly reasonable to assume that this will not be done promptly.

Railroad Rate Basis Challenged

Railroad rates were originally constructed largely on the theory which the late James J. Hill stated—"Give

the settlers the lowest possible rate on the stuff they produce so as to expedite the development of our territory and to help them market their output, but make as high a rate as the traffic will bear on everything they want to buy." On this basis, as our railroad systems spread over the west. Wheat raised 2,500 miles distant from the seaboard or cotton raised as far as 500 miles inland, were able to compete in the export market. Since the railroads have ceased to be a monopoly the trucks everywhere have gone after the profitable business and have either obtained it or have compelled the railroads to reduce rates to such an extent as seriously to reduce net earnings.

Now that it has become the duty of the Commission to foster both methods of transportation, the question of the actual cost of hauling by either class of carrier is not necessarily the dominant factor. It is the duty of the Commission to see that both charge a fixed and fair rate to everybody and, after allowing a proper amount for depreciation, make a reasonable profit on the investment as a whole. Undoubtedly in the long run, this will mean that the trucks will monopolize the short-haul business which they can carry on at a lower cost and in which they can give the public a better service. Long-haul truck traffic will undoubtedly be discouraged in view of the fact that most of the existing railroad mileage must be maintained and must be permitted, therefore, to make an adequate profit.

Rail Line-Haul Cost Only Fraction of Motor Carriers'

At any rate, even with the amazing progress in the construction and operation of trucks, it is quite certain that the truck cost even on large vehicles is at the very least 3 cents per ton-mile which is over three times the average cost on the railroads, particularly so if the short-haul traffic is excluded. The railroad is eminently suited for mass production of transportation which is evidenced by the fact that those rail carriers which receive the lowest rate per ton per-mile but carry largely one type of low class commodity are the biggest money-makers. The outstanding examples are the Chesapeake & Ohio, Norfolk & Western and the Virginian, which carry coal almost exclusively, at an average rate of less than 7 mills per ton-mile.

The problem of rate regulation by the Commission is somewhat further complicated by the fact that it has no jurisdiction over private carriers and if a large shipper should find it cheaper to ship his commodity on his own trucks, nothing can be done about it; except that paragraph 3 of the law gives the Commission authority "To establish for the private carriers of property by motor vehicle if need therefor is found, reasonable requirements to promote safety of operation, and to that end prescribe classifications and maximum hours of service of employees, and standards of equipment."

An interesting and very sound provision of the law is

the one which prohibits dual operations, that is, no person holding a certificate permitting him to be a common carrier or a permit to be a contract carrier shall use his vehicles over the same route or within the same territory for the purpose of a private carrier, and vice versa. Inasmuch as the private carrier is not permitted to solicit a return load for his vehicles, he will be somewhat handicapped except where he, himself, can provide a return load. Heretofore there have been a lot of what might be called, for the lack of a better name, "chameleon" carriers; that is, a truckman might during the same day be a public carrier taking freight of any kind from anybody; a contract carrier who handles a whole load for some one party at probably a fixed rate per load, or he might become a private carrier who buys and carries on his own account a load, say, of coal or potatoes for resale.

A very important provision of the law is that no carrier by highway in interstate commerce may operate after the law goes into full effect except after obtaining a permit. The law contains a "grandfather" clause which entitles anyone who operated trucks on June 1, 1935, to continue doing so, for at least four months and presumably entitles him to a preference for a certificate thereafter. Newcomers may not engage in competition until they prove that they are entitled to what is called in railroad parlance "a certificate of convenience and necessity." The law also provides that all carriers must have adequate insurance to protect their cargoes and to protect anyone injured by them.

Truckers Who Make a Living by Overworking Their Help

The provisions for proper hours of service, ample safety and insurance will undoubtedly increase the cost of operating trucks to some extent and, in the case of small operators who make a living by overworking their help, the cost may almost be doubled. Obviously, the Commission must deal with operating costs of trucks as these stand at present. The question whether license or gasoline taxes are too high or too low is not up to it. The law does, however, contain a provision that this subject shall be studied. All operators of trucks and buses must keep accounts as prescribed by the Commission, the same as the railroads do. This will be quite a complicated problem for some of the smaller truckmen.

Classification Due to Be Simplified

The most important consequence, although not prescribed in the act, is the matter of classification of freight. While the huge book which at one time contained some 18,000 classifications of various commodities handled by the railroads has been shrunk of late by possibly 10 per cent it is much too complex not only for the truckmen but for the average shipper, as has been evidenced in answer to the Co-ordinator's questionnaires. Somehow the classification of freight will have to be greatly simplified to meet both the truckmen's and, most important, the shippers' points of view. It might be necessary to come down to well within ten different classifications. This would be not an evolution but a revolution—but it is bound to come! Quite likely these new classifications may have to be based, very similar to shipments by water, on the density and weight per cubic foot of commodity rather than on value. The percentage of damage in transit is so small nowadays, that the value of the commodity apparently has ceased to be a serious factor in the fixing of rates. The bulk of damage claims arises more from careless packing and stealing than from bad handling, except in a few perishable commodities like fruit, on which there are always bound to be claims on account of delay or alleged inadequate refrigeration

or ventilation, etc. The matter of getting a return load for either trucks or railroad cars carrying a given commodity in one direction will have to be given consideration in the rate structure.

Inside of a decade—possibly within half that time—if the states co-operate promptly, our transportation system is likely to be greatly changed for the better by the co-ordination of all types of carriers and the development of universally exchangeable containers. The actual cost of moving freight by rail, other than the loading, terminal, switching and similar costs, is amazingly low; probably on the average under one-third of one cent per ton-mile. The cost of loading many commodities into cars is more than the "rolling cost" for a hundred miles. Much freight moving by rail has to be handled several times, even if it is loaded into cars at private sidings; the loading and unloading of trucks and containers is infinitely more elastic and cheaper. No truck can at present be operated for less than 12 cents per mile at the very lowest; railroads can make a better profit in hauling trucks aboard cars at this price than they can do on the average carload. The implication of this to all parties concerned, is obvious.

Rearrangement of the Commission

It is probably quite fortunate that the suggestion that there be a separate commission to regulate motor traffic was not adopted by Congress because it would have tended to complicate rather than to simplify the problem. As the matter stands now, the Commission has created a division to take charge of transportation by motor, composed of three of its younger men who have appointed an experienced man to take charge of the Motor Division. While possibly irrelevant, it is interesting to note that the three men composing this particular division come from New England, the far Northwest and the South respectively, and politically one is an independent, one a Democrat and one a Republican.

Sub-divisions of the Motor Division have been created, each one of which will have ample scope for activities. There will be sections in Washington having charge of matters as follows:

- | | |
|-------------------------------|----------------------------------|
| 1. Certificates and insurance | 6. Research |
| 2. Traffic | 7. Statistics |
| 3. Complaints | 8. Legal and enforcement matters |
| 4. Finance | 9. Administration matters |
| 5. Safety | |

It may also be found that a separate bureau for buses will be needed. Besides, there will be a field organization. For this purpose the country has been divided into 16 districts each under the charge of a district director who will be assisted by a joint board agent and one or more rate and traffic agents and one or more accountants, together with several supervisors and the necessary stenographic and clerical force. As section heads and assistants, men of experience have been nominated, and quite a number have had practical experience in the bus and truck business.

The Motor Division already has 600 employees, but as it gets into working order undoubtedly more men will be required and it seems probable that in order to properly administer the motor carrier law, the employees of the Commission will be more than doubled and that the new palatial building (without mail chutes) on Constitution Avenue but recently erected, will be found inadequate to house the entire organization. (The writer hopes that visitors to the building will be supplied with roller skates in order to negotiate the enormous distances).

Obviously, in order to find, supervise and control the number of truck and bus operations subject to the law,

estimated by the Co-ordinator and chief of the Motor Division, Mr. Eastman as, possibly over 250,000, a huge organization is unavoidable.

The law provides in a vague way for state boards to co-operate with the I.C.C. Motor Division in an advisory capacity or otherwise, in the issuance of certificates. The status of these boards will have to be more closely defined in accordance with experience, of which an ample amount will shortly be painfully acquired.

The matter of regulation of buses presents problems of an entirely different type. The large companies which do the bulk of the interstate bus business have undoubtedly properly equipped vehicles and pay fair wages. Bus operations have been improved to such an extent that the average cost is probably about $\frac{3}{4}$ of a cent per seat-mile, after adequately allowing for depreciation. If the buses could always run full they could be making good money at one cent per mile. Experience has taught the companies the size of vehicles suitable for particular runs and the percentage of empty seat-miles is not very large. Statistics on bus operations for the country as a whole are not complete although some of the larger companies have very detailed information about their own affairs.

"Inherent Advantage" Lies With Railways and Not the Long-Haul Bus

The cost per seat-mile in railroad operation is very elastic. There are very few regular trains indeed which carry even a full carload of 72 or 80 people for any distance. Assuming that the average hauling capacity of a ten-year-old passenger locomotive is ten cars, say with a total carrying capacity of 720 people, on this basis the cost per seat-mile would be around 2 mills or about one-quarter of the cost of buses.

The real problem, therefore, is one of filling the trains, which resolves itself to the question as to what rate will fetch the most dollars. Thus far the reduction of all passenger rates in the West to 2 cents and the reduction of passenger rates in day coaches in the South to $1\frac{1}{2}$ cents has resulted in about the same number of dollars on the much higher previous rates. This low rate has created more friends for the railroads. A small inter-urban railroad in central New York on July 15 inaugurated the experiment of reducing rates to 1 cent per mile with even a slightly lower rate for round trips. Thus far the results have been a slight, but cumulatively greater, increase in earnings.

The matter of compelling railroads in the East to reduce passenger rates is now before the Commission. The bus companies have sent a joint representative to oppose such reduction on the theory that substantially lower rates by the railroads will be unjust to the bus companies.

On the whole, long-distance buses are undoubtedly patronized on account of their lower fare. They are a great convenience for the incidental local traffic which they carry but they certainly have not the inherent advantages (to which the law refers) for handling long haul business. If the railroads were to reduce their rates substantially they could surely take away the bulk of the bus companies' business and would also keep many people from using their automobiles, as has been the case with the new fast trains between Chicago and the Twin Cities and Kansas City and Omaha. How to mete out even justice to passenger carriers by rail and highways is just another knotty question for the Commission.

The volume of passenger business is capable of an almost indefinite increase, dependent on the rate and type of accommodations. In passenger traffic, the changes in the next decade may be even greater than those in freight traffic.

What the Santa Fe Bought

THE purchase by the Atchison, Topeka & Santa Fe of some 23,000 shares of stock of the Southern Kansas Stage Lines by the General Improvement Company, a subsidiary of the Atchison, Topeka & Santa Fe, as announced in last month's Motor Transport Section, means that the largest independent bus operator in the country has come under Santa Fe control, in addition to several important truck lines.

The truck lines serve Kansas City, Ft. Smith, Oklahoma City, Joplin, Wichita, St. Joseph, Enid, Omaha, Lincoln and intermediate points.

The bus properties include the following:

Cardinal Stages: Operating in northern Kansas and eastern Colorado.

Santa Fe Trail Stages: Operating between Denver and Los Angeles.

Blue Coach Motor Lines: Operating between Chicago and Kansas City.

Southern Kansas Greyhound Lines: Operating between Tulsa and Kansas City (50 per cent interest; the other 50 per cent being owned by the Southwestern Greyhound Lines).

An announcement by President Bledsoe of the Santa Fe indicates that no personnel changes are contemplated, and that the headquarters of the highway subsidiary will remain in Wichita, Kan.

Bus Operators Meet

REGULATION played a major part in the considerations of the National Association of Motor Bus Operators at their convention held in New Orleans, La., on October 24 and 25. The meeting was addressed by Joseph B. Eastman, federal co-ordinator, and Interstate Commerce commissioner in direct charge of motor transport regulation, as well as by John L. Rogers, director of the Commission's bureau of motor carriers. These addresses clarified the situation as to what the Commission intends to do and hopes to accomplish in connection with motor carrier regulation, particularly as it applies to bus operation. Congressman G. C. Sadowski also addressed the meeting and reviewed the progress of motor carrier legislation through Congress, while Frank P. Morgan, president of the National Association of Railroad and Utilities Commissioners explained the proposed functions of the state commissions in making the new motor carrier regulation effective.

In addition to discussions of safety and the general improvement of equipment, serious consideration was given to the problem of air-conditioning buses. A special committee, of which F. C. Horner was chairman, rendered a report on this subject, and two specialists from the engineering field, W. A. Schmid, Jr., of the National Association of Ice Industries, and L. G. McClenahan, of the Houde Engineering Corporation, delivered addresses on air conditioning of buses by means of ice and mechanical refrigeration, respectively.

An interesting address was also delivered by Captain E. V. Rickenbacher, general manager, Eastern Air Lines, on co-ordinating air and bus transportation.

Other addresses were delivered by Robert L. Freer, commissioner, Federal Trade Commission, Wm. G. Fullen, chairman of the New York Transit Commission, Miss Bertha McCall, general director, National Association for Travelers Aid, and R. S. Hecht, former president of the American Bankers' Association.

Burlington Enters Truck Field

THE Burlington Transportation Company, subsidiary of the Chicago, Burlington & Quincy, has hitherto confined itself entirely to passenger operations. As a logical step in its expansion, however, this company has recently entered the truck field by the purchase of the Merchants Cartage Company of Galesburg, Ill., and the Corn Belt Transportation Company of Ottumwa, Iowa.

The Merchants Cartage Company, founded in 1928, is one of the largest highway transportation companies operating in the territory it serves. The Corn Belt Transportation Company is also one of the older highway transportation companies operating interstate between Chicago, Omaha, Neb., and Kansas City, Mo., and intermediate points. Both the Merchants Cartage Company and the Corn Belt Transportation Company will be operated as freight divisions of the Burlington Transportation Company.

What to Do With Truck Rates?

A WIDE divergence of opinion among truckers as to the proper rates to be established under the new regulation was evidenced at the rate meeting of the American Trucking Associations convention in Chicago on October 16. Representatives of shipping bodies and shippers predicted that, if rail rates were used as a basis, there would be a marked swing from the highway to rail as soon as such rates were made effective. The shippers' representatives urged the establishment of cost-plus rates, as against the strong movement for the rail basis. In this stand, other speakers, claiming to represent a majority of the truckers, agreed. Opposition developed, however, from the truckers of the Pacific Coast and intermountain states who favor the rail rate as a basis. Leland James, a truck operator from Portland, Ore., who is also head of the Truck Owners' Association of Oregon, stated that he represented the opinion of all truckers in the regions named, and that they wanted the rates established on the present basis, which, he said, is in accordance with the rail rates. He explained that, in his opinion, conditions surrounding highway transportation in the Far West were quite different from those in other parts of the country, and that the rail rate basis was an absolute necessity in the section which he represents.

A new angle to the rate situation was brought up by L. M. Voss, Oklahoma City, Okla. Mr. Voss argued against the establishment of the same rate in one direction as the other, and stated that the present rates from Chicago to Oklahoma City were about double the rates from Oklahoma City to Chicago. His company, he said, loses money on the northbound movement and obtains not only a profit *per se* on the southbound movement, but also enough extra to make up the loss incurred in the northbound movement.

As previously announced, Ted V. Rodgers was re-elected president of the association. John W. Blood was re-elected first vice-president. Other appointments follow: Second vice-president, P. F. Arnold; third vice-

president, H. E. Sheridan; fourth vice-president, W. E. Stodghill; vice-presidents, H. E. Boysen, H. D. Horton, F. G. Dorsey, J. F. Rowan, B. F. Morris, W. C. Winkler, E. A. Ward and C. S. Reynolds; secretary, W. W. Belson; and treasurer, J. F. Winchester.

Commission Issues Motor Transport Forms

THE first forms for use by the new Bureau of Motor Carriers, designated as B.M.C. series Nos. 1 to 12, inclusive, were issued by the Interstate Commerce Commission under date of October 11, 1935. They consist of the following blanks:

1. Property carrier application (under grandfather clause)
2. Passenger carrier application (under grandfather clause)
3. Designation of agent
4. Application for broker's license—property
5. Application for broker's license—passenger
6. Application for registration—property
7. Application for registration—passenger
8. Application for common carrier operations instituted since June 1, 1935—property
9. Application for common carrier operations instituted since June 1, 1935—passenger
10. Application for contract carrier operations instituted since July 1, 1935—property
11. Application for contract carrier operations instituted since July 1, 1935—passenger
12. Application for exemption of carriers engaged in the transportation of passengers in interstate or foreign commerce solely within municipal areas.

These forms may be obtained at the offices of the state boards and commissions or at the headquarters of motor carrier associations. All applications under the grandfather clause must be filed within 120 days from October 15, 1935.

The rules and regulations covering the filing and approval of surety bonds, policies of insurance, qualifications as a self-insurer, etc., as provided in Section 215 of the Act, have not yet been worked out by the commission. However, no certificate or permit will be issued in response to any of these applications until such rules are established and complied with by the applicant.

Grandfather Applications

The applications under the grandfather clause for freight transporters require full information as to the corporate status of the applicant and must be supported by three exhibits. Exhibit A must give complete descriptions of the routes in regular operation and the commodities handled, also whether all intermediate points between the stated termini were served and what off-route points were served. The frequency of service, the points of traffic interchange and the through rates, if any, with other companies must be shown. A complete description of any irregular service supplied by such carriers is also asked for, together with information as to the number of vehicles in service, classified as to types of equipment and whether owned or leased.

Exhibit B is reserved for proof of operation on the dates named, while Exhibit C is the certificate of service rendered.

Form B.M.C.-2, the passenger carrier application under the grandfather clause, asks for similar information contained in Exhibits A, B and C of the freight applications, except that, under character of traffic, the applicant

is required to state whether express, mail or newspapers were transported in the same vehicle with passengers. A complete description of special and charter services is also required and the description of the vehicles owned provides for classification of the buses into the various categories, dependent upon seating capacity, on the following basis:

15 seats and under
16 to 21 seats
22 to 29 seats
30 to 33 seats
34 to 40 seats
Over 40 seats
Sedans

The commission clarifies the definition of common and contract passenger service by stating on the form that special and charter service will be generally regarded by it as common carrier service. Contract carrier passenger service will consist of such activities as contracting for the transport of the employees of a particular industrial enterprise, where the fares are paid by the latter, and not by the employees.

All applications must be delivered to the commission in duplicate, one copy to be properly signed and sworn to by a notary public, and additional copies must be filed with the board of each state in which operations are conducted.

It is expected that the issuance of these forms will result in an avalanche of returns, amounting to approximately a quarter of a million applications.

New Haven Files Under Bankruptcy Act

(Continued from page 542)

deficit in its cash account of \$4,496,000. As collateral the company offered its securities already pledged with the Reconstruction Finance Corporation, its equity in collateral pledged to the Railroad Credit Corporation and miscellaneous securities held in its treasury for which no quotations are obtainable. Net deficits of the company after guarantees in 1932, 1933 and 1934 were \$1,355,153, \$5,977,273 and \$6,655,553 respectively. The estimated deficit for 1935, after guarantees, is \$5,006,409.

The management of the company has been putting forth strenuous efforts for more than a year to reduce operating expenses and has met with considerable success. Operating expenses for the first eight months of the current year were \$34,196,739, representing a reduction of \$1,209,284 from the same period last year. But traffic was disappointing in the first half of the year and the increase in operating expenses due to the restoration of peak wage levels in April further added to the company's difficulties. Freight revenues for the first eight months of the current year totaled \$26,649,979, a decrease of \$251,342 from last year. Passenger earnings—an important source of income on the New Haven, which differentiates it from practically every other railroad in the country—were \$14,454,725 in the first eight months, an increase of \$160,247 over last year. But express and mail traffic declined sharply, the losses in such business more than offsetting the gains from increased travel patronage. Operating revenues for the first eight months this year totaled \$45,339,009, a decrease of \$311,171 from last year. In spite of adverse conditions, the management was able to reduce the operating ratio this year to 73.8 from 75.9 in the first eight months of 1934. In an estimate supplied by the

company to the Interstate Commerce Commission, the cost to it next year of the Railroad Pension Act, the Social Security Act and the Guffey Coal Bill was put at \$1,500,000.

Balance Sheet and Income Account

The general balance sheet of the New Haven showed \$565,564,972 as total investments on August 31. Included therein were investments of \$354,032,323 in road and equipment; improvements on leased railway property, \$13,059,546; sinking funds, less company issues, \$627,251; deposits in lieu of mortgaged property sold, \$111,815; miscellaneous physical property, \$1,596,476; and investments in buildings at Grand Central Terminal, stocks, bonds, notes, and advances of \$196,137,561. The amount of stocks, bonds, notes and advances pledged is shown to be \$89,400,385.

Total current assets shown in the same balance sheet were \$16,734,739, which includes cash, \$2,911,531; special deposits, \$493,650; accounts receivable, \$2,887,723; rents receivable, \$1,578,784; and material and supplies, \$6,378,521. Current liabilities amounted to \$36,454,062, of which \$25,703,226 represented loans and bills payable; \$1,604,919, traffic and car service balances; \$2,957,908, audited accounts and wages; \$399,502, matured interest unpaid; and \$2,680,163, accrued unmatured interest.

Deferred assets totaled \$2,496,442; deferred liabilities, \$11,636,484; unadjusted debits, \$4,282,108; and unadjusted credits, \$65,314,330, including \$52,763,911 of accrued depreciation. The deficit in corporate surplus was \$704,002, in which was reflected a deficit of \$3,170,492 in profit and loss balance.

The total capital stock outstanding on August 31, 1935, was \$206,155,300, consisting of \$157,118,600 common and \$49,036,700 of 7 per cent cumulative preferred. Premiums on capital stock are recorded at \$12,538,037. As of the same date, the road's total long-term debt amounted to \$257,541,384 outstanding in the hands of the public, consisting of \$96,991,000 mortgage-bonds, \$124,577,250 debentures, \$13,535,000 equipment obligations, \$22,015,378 miscellaneous obligations, and \$422,756 non-negotiable debt to affiliated companies.

The income account, which includes the Central New England and Harlem River & Port Chester prior to 1927 shows that net revenue from railway operation averaged \$34,194,522 a year in the 10-year period 1921 to 1930. Gross income averaged \$27,200,626, of which \$5,891,468 constituted non-operating income. Deductions exclusive of interest, averaged \$5,443,657, leaving \$21,756,969 available for interest. In this period, interest on debt averaged \$15,062,203 and net income \$6,694,767.

Railway operating revenues decreased from an average of \$135,359,740 in this 10-year period to \$100,331,093 in 1931, \$74,973,252 in 1932, \$67,224,751 in 1933, and \$69,283,110 in 1934. For 1935, with the last four months estimated, the road anticipates that it will amount to \$70,438,009. Fixed charges (rent for leased roads, interest on funded and unfunded debt, and amortization of discount on funded debt), with the last four months estimated, will amount to \$17,792,980 in 1935, and, according to estimate, to \$17,731,000 in 1936.

SUPPLEMENTING ITS "MEALS SELECT" DINING CAR SERVICE by means of which the prices of breakfast, luncheons and dinners were reduced 50 per cent, the Southern Pacific has introduced a new tray service, featuring light refreshments for five and ten cents. The tray service is provided in chair cars, coaches and tourists sleeping cars. Included in the offering of "five and dime" foods and drinks are sandwiches, cookies, doughnuts, coffee, milk, orangeade, tomato juice, soda waters, apples, oranges and other items.

NEWS

No Sacrifice of Safety in Faster Rail Service

Taylor cites record for first half of year when no passengers were killed in train accidents

By stepping up their schedules without sacrificing the wide margin of safety which has been maintained for many years, with the result that in the first six months of 1935 not a passenger was killed in a train accident, the railroads have established a record not yet achieved by their competitors on the highway or in the air, according to H. G. Taylor, chairman of the Western Association of Railway Executives, in an address before the Western Railway Club at Chicago on October 21. This achievement in the conservation of human life, he said, is even more significant when it is realized that the volume of passenger traffic carried in this period exceeded the same period a year ago and aggregated 8,600,000,000 passenger miles. In his address, he discussed the introduction of high-speed trains during the past year and called attention to their effect on passenger schedules throughout the country.

To show the advancement made in freight train speeds, he said that in 1920 the average running time of freight trains between division terminals, including delays enroute, was 247.2 miles per day, or an average of 10.3 miles per hour, while in 1934, the operation had been improved to the point where the average miles per day reached 381.6, with an average of 15.9 miles per hour. In the western district, the increase over the same period was from 266.4 miles per day to 405.6 miles, the increase in the average miles per hour being from 11.1 to 16.9. "It is significant to observe," he said, "that this speed has been accomplished without any substantial loss in average tonnage per train. Much of the credit goes to the modern type freight locomotive which is capable of sustained speed of 45 miles per hour and better with loads as high as 10,000 gross tons. Many freight trains throughout the country are today operated on passenger train schedules. The established schedule on perishables from the Pacific Coast to Chicago is 146 hr. with a runoff time of 16 hr., thus providing for a maximum of 130 hr. Due to stops for icing, inspection, diversion and other purposes, it is necessary for many of these trains to operate at 60 miles per hour or even faster."

To show the reliability of expedited service, he stated that during the first six months of 1935, of 218,596 package cars

operated out of Chicago, 97.85 per cent reached their destination on time.

"In appraising the factors that make increased railroad speed possible," he said, "it is not strange that the average man is inclined to place the emphasis on the moving unit. I think it should be said, however, that the 90 or 100-mile velocity is not altogether the product of high-powered Diesel engines, reduction of air resistance by streamlining, lighter weight equipment and low center of gravity. All of these would be unavailing without the track and road-bed over which these trains move. Just as the modern highway has lifted the speed limits of the automobile, to the same degree has the modern railway made possible the accomplishments of recent days. It has been known for years that there were locomotives that could attain speeds of 100 miles per hour and more, but experienced railroad men were unwilling to operate them at such speeds because track conditions did not justify it. It follows, therefore, that railroad speed is a product not alone of new types of power and cars, but represents the sum total of improvements in practically every department."

Electric Lines Not Exempt From Labor Act

The Interstate Commerce Commission has issued reports finding that the Piedmont & Northern and the Fort Dodge, Des Moines & Southern are not "street, interurban, or suburban" electric railways of the class which is exempt from the provisions of the railway labor act.

Fatal Collision in Brazil

A press dispatch from Rio de Janeiro, October 17, reports a rear collision of passenger trains at San Francisco Xavier station, during the evening rush hour, causing the death of 15 persons and the injury of a large number. Delays and excitement led to riots among commuters.

B. & M. "Bike and Hike" Train

The Boston & Maine on October 20 operated between Boston, Mass., and Epsum, N. H., and Pittsfield, its second "bike and hike" train with bicycles being carried for the use of passengers at destination. This innovation was introduced by the B. & M. on October 6 and, according to the announcement, proved "very popular" despite a rainy Sunday. Passengers making the "bike and hike" trips are invited to bring their own bicycles which are checked without charge; or they may rent bicycles from a stock in the baggage car of the train. About 100 bicycles were carried on the October 20 trip, according to the announcement.

President Approves Many Grade Crossing Programs

Partial or complete plans are now sanctioned for 16 states and the District of Columbia

Partial or complete programs for the elimination of hazards at rail-highway grade crossings under the allocation of \$200,000,000 of Works Program funds have now been approved by President Roosevelt for 16 states and the District of Columbia, according to announcements issued by the Department of Agriculture. Announcements of the programs for two or three states at a time have been coming out for several days, in addition to those for Michigan and Alabama that were approved some weeks ago. In some instances the federal funds are being supplemented by state funds. Programs for which approval has been announced within the past week, in addition to those previously reported in the *Railway Age*, are as follows:

A program submitted by the State Highway Commission of Wisconsin involving \$2,141,000 of the funds previously apportioned by the Secretary of Agriculture to Wisconsin for the elimination of hazards at grade crossings in that state. As the total apportionment to Wisconsin under the \$200,000,000 Works Program allocation for grade crossing elimination is \$5,022,683, there remains a balance of \$2,881,683 to be covered by later programs. The funds are to be applied to the following classes of projects as defined in the approved rules and regulations governing the expenditure of these funds: Eight projects on secondary or feeder roads outside of municipalities, involving the elimination of railroad grade crossings by the construction of grade separation structures at a total estimated cost of \$1,185,000; three projects on the federal-aid highway system outside of municipalities, three crossings to be eliminated by construction of two new grade separation structures, the other by reconstruction of an existing structure, at a total estimated cost of \$270,000; and five projects within municipalities not on extensions of the federal-aid system, one involving reconstruction of an existing grade separation structure and the elimination of six railroad grade crossings by construction of six new grade separation structures, at a total estimated cost of \$686,000.

A program submitted by the Indiana State Highway Commission involving \$2,985,000 of the funds previously apportioned. As the total apportionment to Indiana is \$5,111,096, there remains a bal-

ance of \$2,126,096. The funds are to be applied to 12 projects on the federal-aid highway system outside of municipalities, involving the elimination of 14 railroad grade crossings by the construction of 12 grade separation structures, at an estimated cost of \$1,186,500 of Works Program funds and \$7,500 of state funds; two projects on secondary or feeder roads involving the elimination of four railroad grade crossings by two highway relocation projects, at a total estimated cost of \$112,000; seven projects within municipalities on extensions of the federal-aid system, involving the elimination of ten grade crossings by the construction of seven grade separation structures, at a total estimated cost of \$1,164,000; one project within a municipality, involving the elimination of one railroad grade crossing by the construction of one grade separation structure, at an estimated cost of \$522,500 of Works Program funds and \$132,500 of state funds.

A program submitted by the Oregon State Highway Commission involving \$1,624,791. As the total apportionment to Oregon is \$2,334,204, there remains a balance of \$709,413 to be covered by later programs. The funds are to be applied to six projects on the federal-aid highway system outside municipalities, involving the elimination of railroad grade crossings by construction of grade separation structures at a total estimated cost of \$674,449; two projects within municipalities on extensions of the federal-aid system, involving the elimination of railroad grade crossings by construction of grade separation structures at a total estimated cost of \$536,933; and four projects on secondary or feeder roads, involving the elimination of railroad grade crossings by construction of grade separation structures at a total estimated cost of \$413,409.

A program submitted by the State Highway and Public Works Commission of North Carolina involving \$1,579,000. As the total apportionment to North Carolina is \$4,823,958, there remains a balance of \$3,244,958. The funds are to be applied to seven projects on the federal-aid highway system outside of municipalities, involving the reconstruction of existing grade separation structures, the elimination of grade crossings by the construction of grade separation structures, and the elimination of railroad grade crossings by highway relocation projects, at a total estimated cost of \$594,000; eight projects within municipalities on extensions of the federal-aid system, involving the reconstruction of existing grade separation structures and the elimination of grade crossings by the construction of grade separation structures, at an estimated cost of \$644,000 of Works Program funds and \$52,000 state funds; four projects within municipalities not on extensions of the federal-aid system, involving the reconstruction of one existing grade separation structure and the elimination of grade crossings by the construction of grade separation structures, at a total estimated cost of \$272,000; and two projects on secondary or feeder roads outside of municipalities, involving the reconstruction of existing grade separation structures, at a total estimated cost of \$69,000.

A program submitted by the Depart-

ment of Public Works of the State of Massachusetts involving \$1,270,000. As the total apportionment to Massachusetts is \$4,210,833, there remains a balance of \$2,940,833. The allocations are to be applied to two projects on the federal-aid highway system outside of municipalities, involving the elimination of railroad grade crossings by the construction of grade separation structures, for a total estimated cost of \$610,000; one project within a municipality on an extension of the federal-aid system, involving the elimination of a grade crossing by the construction of a grade separation structure, for a total estimated cost of \$280,000; and one project within a municipality not on an extension of the federal-aid highway system, involving the elimination of a grade crossing by the construction of a grade separation structure, for a total estimated cost of \$380,000.

A program submitted by the State Highway Commission of South Dakota involving \$1,397,500. As the total apportionment to South Dakota is \$3,249,036, there remains a balance of \$1,851,586. The allocations are to be applied to 16 projects on the federal-aid system outside of municipalities, three involving reconstruction of existing structures, seven entailing the elimination of railroad grade crossings by relocation of the highway, four involving the installation of crossing signals, and two the construction of grade separation structure at an estimated cost of \$840,500 of Work Program funds and \$4,000 state funds; 21 projects within municipalities on extensions of the federal-aid system, involving reconstruction of one existing grade separation, sixteen entailing the installation of crossing signals, one involving the relocation of highway to avoid grade crossing, and three involving construction of separation structures at a total cost of \$401,000; two projects within municipalities not on extension of the federal-aid system, both involving the elimination of grade crossings by construction of grade separation structures, at the estimated cost of \$75,000, and three projects on secondary or feeder roads outside of municipalities involving the construction of two grade separation structures, and one involving the relocation of highway, at a total estimated cost of \$81,000.

A program submitted by the State Highway Commission of Nebraska involving \$1,128,000. As the total apportionment to Nebraska is \$3,556,441, there remains a balance of \$2,428,441. The funds are to be applied to nine projects on the federal-aid system outside of municipalities, involving the elimination of railroad grade crossings by the construction of grade separation structures, at a total estimated cost of \$436,000; seven projects located within municipalities on extensions of the federal-aid system, involving the elimination of railroad grade crossings by the construction of grade separation structures, at a total estimated cost of \$488,000; and three projects located outside of municipalities on secondary or feeder roads, involving the elimination of railroad grade crossings by the construction of grade separation structures, at a total estimated cost of \$204,000.

A program submitted by the Florida State Road Department involving \$1,084,000, for the elimination of hazards at rail-

way grade crossings in nine counties in the state. As the total apportionment to Florida is \$2,827,883, there remains a balance of \$1,743,883. The funds are to be applied to eight projects on federal-aid system outside of municipalities, involving construction of new grade separations and reconstruction of an existing grade separation, at a total estimated cost of \$763,000; two projects within municipalities on extensions of the federal-aid system, both of which call for the construction of new grade separations, at a total estimated cost of \$248,000; and one project on a secondary or feeder road outside any municipality which involves construction of a new grade separation at an estimated cost of \$73,000.

A program submitted by the Idaho Department of Public Works, Bureau of Highways, involving \$420,000. As the total apportionment to Idaho is \$1,674,479, there remains a balance of \$1,254,479. The funds are to be applied to two projects on the federal-aid system outside of municipalities, involving the elimination of railroad grade crossings by construction of grade separation structures, at a total cost of \$215,000; and two projects within municipalities on extensions of the federal-aid system, involving elimination of railroad grade crossings by construction of grade separation structures, at a total cost of \$205,000.

A program submitted by the Montana State Highway Commission involving \$723,000. As the total apportionment to Montana is \$2,722,327, there remains a balance of \$1,999,327. The funds are to be applied to nine projects on the federal-aid system outside municipalities, four of which provide for the construction of overpasses, two for overpasses with bridges, one an underpass, and two entailing elimination of the crossings by relocation at a total estimated cost of \$523,000; and one project in the city of Butte on the extension of a federal-aid highway where the grade crossing will be eliminated through construction of an overpass at an estimated cost of \$200,000.

A program submitted by the Mississippi State Highway Department involving \$835,450. As the total apportionment to Mississippi is \$3,241,475, there remains a balance of \$2,406,025. The funds are to be applied to six projects on the federal-aid system outside of municipalities, five of which involve the elimination of grade crossings by the construction of separation structures, while the other will eliminate four grade crossings by relocation for a total estimated cost of \$781,000; two projects within municipalities on extensions of the federal-aid system, one eliminating crossings by means of separation structures and the other eliminating two crossings by one relocation, for a total estimated cost of \$19,450; and one project within a municipality not on an extension of the federal-aid system eliminating a grade crossing by a structure at an estimated cost of \$35,000.

A program submitted by the Department of Public Works of Wyoming involving \$428,000. As the total apportionment to Wyoming is \$1,360,841, there remains a balance of \$932,841. The funds are to be applied to five projects on the federal-aid

system outside of municipalities, four of which involve the elimination of railroad grade crossings by the construction of grade separation structures and one eliminates a railroad grade crossing by highway relocation.

A program submitted by the Highway Department of the State of Vermont involving \$729,857. As the total apportionment to Vermont is \$729,857, this program covers the entire apportionment. The allocations are to be applied to nine projects on the federal-aid system outside of municipalities, involving the reconstruction of five existing grade separation structures, the elimination of one railroad grade crossing by the construction of one grade separation structure, and the elimination of six railroad grade crossings by the relocation of three highways, and the elimination of one grade crossing by the construction of one underpass, for a total estimated cost of \$540,000; one project within a municipality involving the reconstruction of one existing grade separation structure, for a total estimated cost of \$10,000; four projects outside of municipalities not on the federal-aid system, involving the reconstruction of one existing grade separation structure, elimination of two crossings by relocation of highway, and the elimination of two grade crossings by the construction of two grade separation structures, involving a total estimated cost of \$179,857.

A program submitted by the State Road Commission of Utah involving \$308,000 of the funds previously apportioned. As the total apportionment to Utah is \$1,230,763, there remains a balance of \$922,763. The allocations are to be applied to two projects on the federal-aid highway system outside of municipalities involving the elimination of two railroad grade crossings by the construction of two grade separation structures, for a total estimated cost of \$154,000, and one project within a municipality on an extension of the federal-aid system, involving the elimination of two railroad grade crossings by the construction of one grade separation structure, for a total estimated cost of \$154,000.

Direct Loans to Industry

Direct government loans to private business are made the subject of a comprehensive factual study, entitled "What About Direct Loans to Industry?" which has been prepared by the Committee on Direct Loans of the National Conference of Business Paper Editors and the Associated Business Papers, Inc. This survey, which comprises the fifth of a series of analytical studies dealing with current national questions of interest to industry, analyzes the loan records of the Reconstruction Finance Corporation, the federal reserve banks and the Federal Housing Administration and points out that only a fraction of the funds intended for use by business have been released. Of approximately \$580,000,000 authorized for the specific purpose of extending credit to industry, only about \$155,000,000 of loans have been approved a year after the R.F.C. and the federal reserve banks were empowered to make direct loans. The reasons for this condition are analyzed in the survey and the factors that have caused business men

to hesitate in applying for loans, as well as the factors that have caused the R.F.C. and the federal reserve officials to hesitate in granting loans are enumerated. The study concludes with a list of recommendations that are designed to correct the situation. Copies of this survey are available at 50 cents a copy through the Associated Business Papers, Inc., 330 West Forty-second street, New York.

Fruit Rates Suspended

Drastic reductions in the rates on citrus fruits, in carloads, from points in Florida to North Atlantic ports and directly intermediate points, proposed by the railroads for the purpose of meeting growing truck and water competition, were suspended by the Interstate Commerce Commission on October 18 until May 21, 1936. As illustrating the extent of the proposed reduction, the tariff provided for a rate of 51 cents per 100 lb. from Jacksonville to New York, in place of the present rate of 78 cents. From Tampa the rate of 94 cents was to be reduced to 68 cents.

Baltimore & Annapolis Rehabilitation Program Completed

Through the co-operation of the Baltimore & Ohio, the Baltimore & Annapolis has been enabled to complete the extensive rehabilitation program undertaken when the latter was organized to acquire the Baltimore-Annapolis "north shore" route of the former Washington, Baltimore & Annapolis.

When the Baltimore-Washington line of the W. B. & A. was recently abandoned after a period of operation under receivership, the bond holders of the "north shore" line appealed to the Baltimore & Ohio for assistance and the latter in an agreement, whereby it receives one-third of the B. & A.'s net income, undertook to aid in the rehabilitation program and permitted the B. & A. to use Camden station as its Baltimore terminus. The W. B. & A. had been an interurban electric line with roadbed and bridges not adapted to the operation of standard B. & O. equipment, which it was desired to use in interline services.

Thus the major part of the rehabilitation program involved the strengthening and improvement of the roadbed and the reconditioning of bridges. The line is now available for both steam and electric operation, the 1200-volt d.c. overhead contact system having been extended into Camden station. About two miles of catenary construction was required.

"There are eight bridges on the Baltimore & Annapolis, each of which had to be strengthened," said P. G. Lang, engineer of bridges of the B. & O., who had charge of the rehabilitation program, "and the biggest job was the half-mile bridge crossing the picturesque and historic Severn river, to which new and sound piles were added and the entire deck of the bridge was raised. It was necessary to install about six miles of piles at this crossing of the Severn.

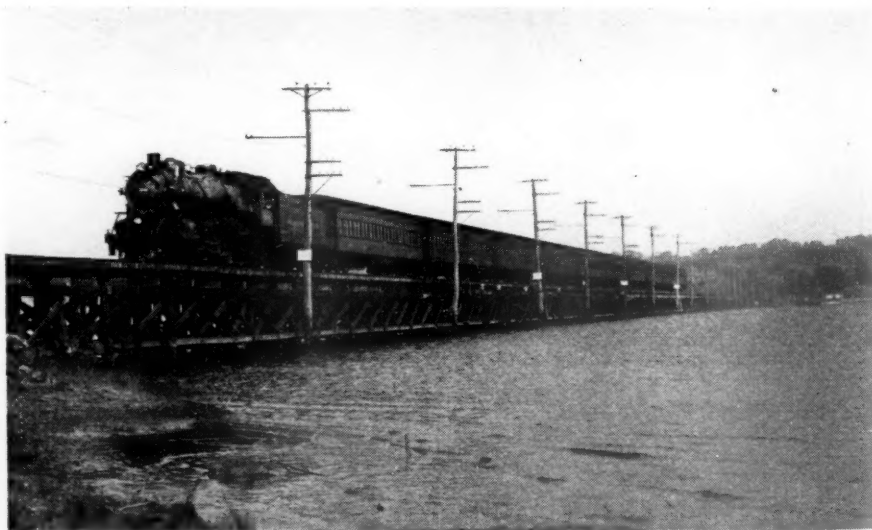
"Among the other bridges revamped were the steel bridges crossing Gwynn's Falls, the Patapsco river and Kent street. The track and roadway were provided with modern heavy rail and appurtenances and new ties. The bridge work alone involved the use of approximately 170,000 feet board measure of timber, other than piles and ties, and 2,000 bridge ties."

"Floridan" to Run Daily

The Floridan, operated by the Illinois Central from Chicago to points in Florida each year during the winter months, will this season be run daily instead of tri-weekly. This is the first time since 1931 that the train has been operated daily.

Annual Meeting of Ticket Agents

The annual meeting of the American Association of Railroad Ticket Agents was held at St. Louis, Mo., on October 21-22, the program being devoted to a study of ways and means of merchandising railway passenger service. Officers elected for the ensuing year are: President, Otto F. Meltzer, city ticket agent of the Chicago, Milwaukee, St. Paul & Pacific, Milwaukee, Wis.; vice-president, A. P. Hardy, assistant city ticket agent of the Southern Pacific, New Orleans, La.; and secretary-



Standard Baltimore & Ohio Train on the Rebuilt Severn River Bridge of the Baltimore & Annapolis

Continued on next left-hand page



Combine POWER and SPEED

These are the prime requisites of present-day transportation.

Modern Super-Power Locomotives provide 25% to 30% more power at speeds than motive power units ten years old and over.

Prepare now for increased traffic and turn the increases in traffic into increased net earnings by the use of modern locomotives.



LIMA LOCOMOTIVE WORKS, INCORPORATED, LIMA, OHIO

treasurer, E. R. Hutton, city ticket agent of the New York Central, Chicago (re-elected).

Pamphlet on Early Connecticut Railroads

A pamphlet entitled "The First Twenty Years of Railroads in Connecticut" has been prepared by Sidney Withington, electrical engineer of the New York, New Haven & Hartford, for the Committee on Historical Publications of the Tercentenary Commission of the State of Connecticut. The booklet of 32 pages traces the beginnings of railroads in Connecticut and includes interesting illustrations of early railroad locomotives and passenger stations. There is also a map of Connecticut on which are plotted the state's railroad routes and the dates of their opening.

National Rivers and Harbors Congress

A special session of the National Rivers and Harbors Congress to be held in New Orleans, La., on December 13 and 14, has been called by former Representative Frank R. Reid of Illinois, president of the organization. The purposes of the meeting, as stated in the call, are:

1. To consider the present status of the rivers and harbors, flood control and waterways program.
2. To formulate a legislative program for presentation at the forthcoming session of the National Congress in January.
3. To take concerted action toward securing the allocation of additional funds by the Administration for meritorious waterway and flood control projects throughout the United States.

Annual Meeting of Dining Car Superintendents

The thirty-fifth annual meeting of the American Association of Superintendents of Dining Cars was held in San Francisco, Cal., on October 15-18, the program being devoted to a discussion of the problems confronting persons charged with the responsibility of dining car operation. Toronto was selected as the city for the 1936 convention. Officers elected for the ensuing year are: President, T. T. Turner, superintendent of dining car service, Missouri-Kansas-Texas; vice-president, J. F. Finnegan, general superintendent of dining car service, Pennsylvania; and secretary-treasurer, F. R. Borger, superintendent of dining car service, Chicago, Indianapolis & Louisville (re-elected).

Mechanical Division Letter-Ballot Returns

At the business session of the Association of American Railroads, Mechanical Division, held at Chicago June 26 and 27, as reported in the *Railway Age* of June 29, recommended changes in the standard practice of the division were made by eight standing committees, including the following: Arbitration, Brakes and Brake Equipment, Car Construction, Couplers and Draft Gears, Loading Rules, Specifications for Materials, Tank Cars, and Wheels. A total of 61 specific propositions were ordered submitted to letter-ballot, and recently compiled returns show that

all of these propositions to amend the standard and recommended practice of the division have been approved, effective March 1, 1936, with the exception of proposition 20 (a) to 20 (i), inclusive, and 56, covering definitions and designating letters in the classification of cars, which are approved to be effective immediately; and of the propositions to amend the interchange rules of the division, which will become effective January 1, 1936.

Southern Pacific Extends Merchandise Freight Service

The Southern Pacific, on October 14, established a new train for the overnight transportation of l.c.l. shipments from the San Francisco Bay area to Bakersfield, Cal., a distance of 313 miles, the train being operated in conjunction with the store-door pick-up and delivery service of the Pacific Motor Transport Company. On its overnight schedule, the merchandise train leaves San Francisco and Oakland after the regular closing hours for merchandise traffic and arrives in Bakersfield at 8:30 a.m. the next day. The new service supplements the overnight merchandise freight service put into effect last May between the San Francisco Bay cities and San Joaquin Valley cities as far south as Fresno.

Club Meetings

The Toronto (Ont.) Railway Club will hold its next meeting at the Royal York Hotel, Toronto, on Monday evening, October 28. The address will be on "What Does a Railway Lawyer Do for a Living?," by John D. Spence, solicitor of the Canadian Pacific, Toronto.

The Northwest Car Men's Association will hold its next meeting at the Midway Club rooms, 1957 University avenue, St. Paul, on Monday evening, November 4. J. H. Remick, general car inspector of the Northern Pacific, will speak on preparation and maintenance of freight and passenger cars for winter service.

The New England Railroad Club will hold its next meeting at the Copley-Plaza hotel, Boston, on Tuesday evening, November 12, beginning with a dinner at 6:30 o'clock. Vice-President R. V. Fletcher, Association of American Railroads, will speak on the future of the railroad industry.

Chicago Car Foremen Elect Officers

The annual meeting of the Car Foremen's Association of Chicago was held Monday evening, September 9, at the La-Salle Hotel, Chicago. At the close of a brief business session with President E. Mazurette, car foreman, Grand Trunk Western Lines, Chicago, in the chair, the following officers were elected for the ensuing year: President, C. O. Young, chief clerk to superintendent car department, Illinois Central, Chicago; First Vice-President, J. S. Acworth, supervisor of equipment, General American Tank Car Company, Chicago, and Second Vice-President, F. A. Shoulty, general car foreman, Chicago, Milwaukee, St. Paul & Pacific, Chicago. The treasurer and secretary were continued in office, the

treasurer being C. J. Nelson, superintendent, The Chicago Car Interchange Bureau, Chicago, and the secretary, Geo. K. Oliver, assistant passenger-car foreman, Baltimore & Ohio Chicago Terminal, Chicago.

Normal Rates to Be Restored on Potatoes and Vegetables

The Interstate Commerce Commission has vacated its suspension orders and issued a report finding justified schedules filed by the railroads proposing to cancel the present temporary truck-competitive rates and to establish the normal rates on potatoes, in carloads, from points in Wisconsin, Minnesota, North Dakota, South Dakota, and the upper peninsula of Michigan to points in the Southwest; on potatoes and vegetables, in carloads, from certain points in Colorado, Wyoming, Utah, Idaho, Montana, Nevada, Oregon, eastern New Mexico, and western Nebraska to points in the Southwest and certain points in Tennessee, Mississippi, and Alabama; on potatoes, in carloads, from certain points in Colorado, Wyoming, Utah, Idaho, Montana, Nevada, Oregon, eastern New Mexico, and western Nebraska to certain points in Colorado, Kansas, Missouri, and Missouri River points; and on vegetables from certain points in Colorado, Wyoming, Utah, Idaho, Montana, Nevada, Oregon, eastern New Mexico, and western Nebraska, to certain points in western trunk line territory.

N. & W. "Better Service Conference"

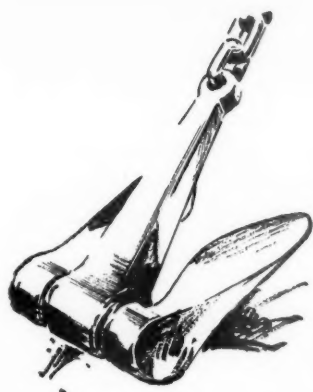
Merle Thorpe, editor and publisher of "Nation's Business," and W. J. Jenks and Sydney F. Small, vice-presidents of the Norfolk & Western, were the principal speakers at that road's annual "Better Service Conference," which was held October 25 and 26 at the Cavalier Hotel, Virginia Beach, Va. More than 300 employees of the N. & W. from five states attended the conference of which J. B. Baskerville, general claim agent of the road, was general chairman.

The addresses of Vice-presidents Jenks and Small were delivered at the opening session on October 25 while that of Mr. Thorpe was made at the annual dinner on the evening of that day. The program for October 26 included an address by Joe Marshall of Chicago, special representative, Freight Claim Division, Association of American Railroads; reports of committees and a general discussion by the delegates.

C. F. Scott Heads Engineers' Council

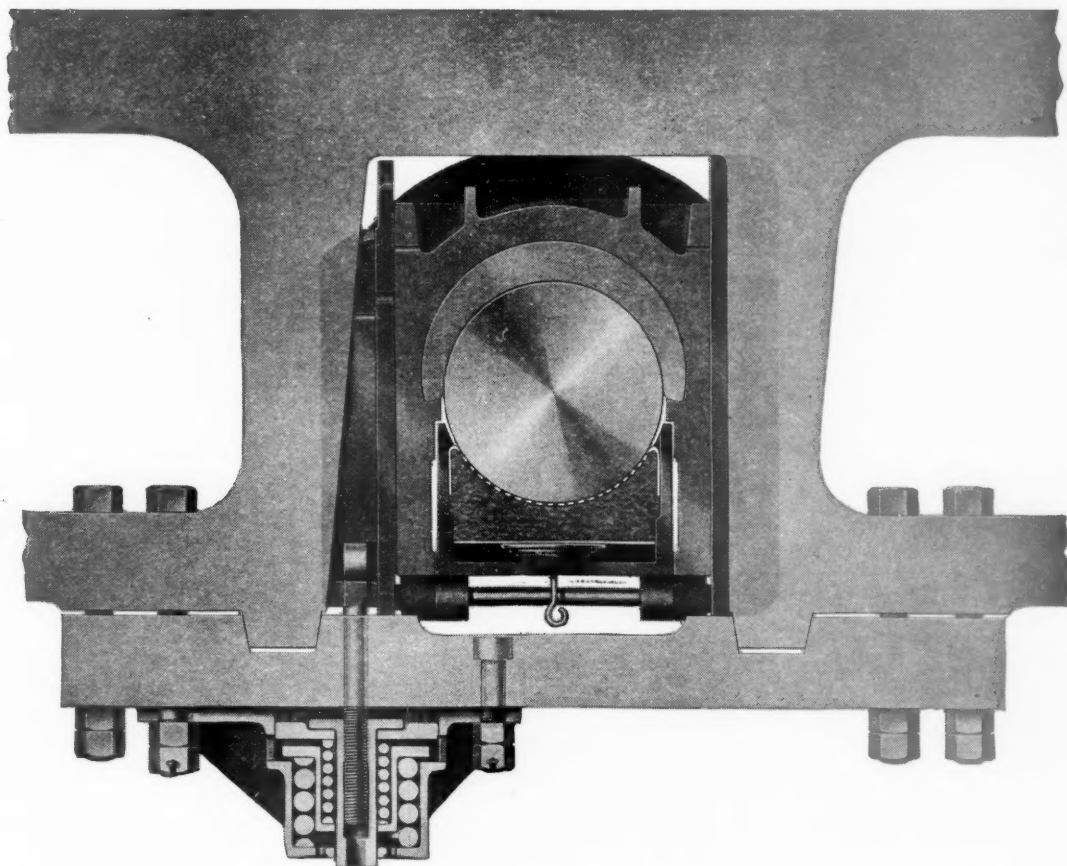
Charles F. Scott was elected chairman of the Engineers' Council for Professional development at that organization's third annual meeting in New York on October 8. Mr. Scott, who is professor-emeritus of electrical engineering at Yale University and chairman of the board appointed to administer the recently-enacted engineers' registration law in Connecticut, succeeds C. F. Hirshfeld, chief of research of the Detroit Edison Company, who had served as the Council's chairman since its organization.

George T. Seabury, secretary of the American Society of Civil Engineers, was



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NEW YORK CHICAGO MONTREAL

re-elected secretary of the Council. Newly-elected members of the executive committee are: C. F. Hirshfeld, representing the American Society of Mechanical Engineers; Harrison P. Eddy, American Society of Civil Engineers; L. W. W. Morrow, American Institute of Electrical Engineers. Other members of the executive committee who continue in office are: F. M. Becket, American Institute of Mining and Metallurgical Engineers; H. C. Parmelee, American Institute of Chemical Engineers; R. I. Rees, Society for the Promotion of Engineering Education; and D. B. Steinman, National Council of State Boards of Engineering Examiners.

Safety Section Ahead of Goal

Statistics compiled by the Safety Section of the Association of American Railroads show a reduction of 30 per cent in the employee casualty ratio during the first eight months of 1935, as compared with the same period in 1933. This reduction is of significance in view of the present goal of the section, adopted in 1934, calling for an average annual decrease in the employee casualty ratio of at least 5 per cent per year during the six years 1934 to 1939, inclusive. The eight months' statement includes data for 119 railroads or systems operating 79 per cent of the mileage of the member railroads. Of these 119 railroads, 56 have so far effected decreases so that their present ratios are lower than actually called for at this time by the goal adopted. Figures for all the roads included in groups A, B, C and D show a total of 342 persons killed and 9,163 injured, with a combined casualty ratio of 6.43 for the first eight months of 1935. In group A, 30,000,000 man-hours or more per year, the figures for 25 railroads show 244 killed and 5,691 injured, or a casualty rate of 5.74, as compared with 6.0 for the first eight months of 1933. In group B, 10,000,000 to 30,000,000 man-hours, the figures for 22 railroads show 62 employees killed and 1,894 injured, or a casualty rate of 7.29, as compared with 8.0 for the same period of 1933. In group C, 2,000,000 to 10,000,000 man-hours, figures for 42 railroads show 29 killed and 1,326 injured, or a casualty rate of 8.96, as compared with 9.95 in 1933. In group D, less than 2,000,000 man-hours, the figures for 30 railroads show 7 killed and 252 injured, or a casualty rate of 10.68, as compared with 12.52 in 1933.

I.C.C. Practitioners Meet

The sixth annual meeting of the Association of Practitioners before the Interstate Commerce Commission was held in New York on October 23 and 24. The program included reports of the association's various committees and addresses by William L. Ransom, president, American Bar Association, and by Interstate Commerce Commissioner Marion M. Caskie, who spoke on "Some Important Aspects of the Administration of the Motor Carrier Act of 1935." Greetings from the Interstate Commerce Commission were extended by Commissioner Clyde B. Aitchison, who represented Chairman Hugh M. Tate.

The address of the association's presi-

dent—W. H. Chandler, manager, traffic bureau, Merchants Association of New York—outlined the work of various committees and commented upon the bill introduced in the last session of Congress by Senator Wagner of New York to prohibit all but lawyers from representing a client before government bureaus, commissions, and executive departments. Mr. Chandler warned that while the bill was not passed at the last session it was nevertheless "far from dead."

The president also urged that serious consideration be given to the report of the committee on education for practice. He pointed out that several recommendations in this connection have been made to the Interstate Commerce Commission, but the latter has not seen fit to follow any of them. Thus Mr. Chandler raised a question as to the desirability of continuing work along these lines, suggesting that if such work were continued the association should state quite definitely just what type of examination it would recommend for prospective practitioners. The discussion of this report, he added, should be thorough and should clarify the association's position on the subject.

R. R. Credit Corporation to Make Additional Distribution

The Railroad Credit Corporation on October 31 will make its twenty-first liquidating distribution to the participating carriers. This will be a 1 per cent distribution and will repay \$735,885, of which \$379,926 will be in cash and \$355,959 in credits on obligations due to the corporation. With this distribution, the corporation will have returned to the participating carriers \$26,491,859, the equivalent of 36 per cent of the fund, of which \$12,045,213 will have been paid in cash and \$14,446,646 in credits.

The Corporation has, since September 30, 1934, already made ten liquidating distributions to participating carriers, returning \$8,059,957, of which \$3,967,864 was in cash and \$4,092,093 in credits on obligations due to the corporation, according to the report submitted by E. G. Buckland, president, at the fourth annual meeting of stockholders, held in Washington on October 15.

Loans aggregating \$73,691,368 made from the fund administered by the Credit Corporation were, under the terms of the plan, for a period of not exceeding two years, but renewable, if the individual account warranted, for an additional term of two years or less. The original loaning period having ended on May 31, 1933, all renewals possible have been made, and the \$49,770,625 of outstanding loans on the books of the Credit Corporation at September 30, 1935, represents the final aggregate of the notes which under the plan may be accepted from borrowers.

Mr. Buckland said that liquidating distributions could be made only from cash accumulated largely through repayments of borrowers' obligations, and that, since the contributions to the fund by non-borrowers were made at a distinct sacrifice, there should be no unnecessary delay in liquidating the trust.

Intensive consideration is being given to

the reorganization plans of certain borrowing roads, looking to the early liquidation of loans either through cash payment, or the realization upon securities issued in reorganization.

A.S.M.E. Annual Meeting

Sessions on Psychology (Symposium on Effect on Human Relations of Technological Changes), Compensation Laws, Occupational Diseases (auspices A.S.M.E. Safety Committee), as well as the regular sessions of the Railroad, Fuels, Power, Applied Mechanics and other divisions of the American Society of Mechanical Engineers, will feature the 1935 annual meeting of the Society to be held at the Engineering Societies building, 29 West Thirty-ninth street, New York, December 2 to 5, inclusive. At the Railroad Division sessions the following papers will be presented:

Tuesday, December 3
9:30 a.m.

Measurement of Steam Rate and Indicated Horsepower of Locomotives, by Arthur Williams
Railroad Mechanical Engineering (Progress report)

2 p.m.

Locomotive and Car Journal Lubrication, by E. S. Pearce

Wednesday, December 4
(Locomotive Session)

2 p.m.

Lateral Oscillations of Rail Vehicles, by H. F. Langer and J. P. Shamberger
Safety of High-Speed Locomotives, by B. S. Cain

Among other sessions of general interest are the following:

Wednesday, December 4
2 p.m.

Boiler Furnace Session

An Experimental Investigation of Heat Absorption in Boiler Furnaces, by W. J. Wohlenberg, H. F. Mullikin, W. H. Armacost and C. W. Gordon

Critical Review of Methods of Computing Heat Absorption in Boiler Furnaces in the light of data Presented in Part I by W. J. Wohlenberg and H. F. Mullikin

An Empirical Method of Solving for Heat Absorption in Boiler Furnaces, by H. F. Mullikin

Thursday, December 5

2 p.m.

Oil and Gas Power Session

Film Lubrication Theory and Engine Bearing Design, by E. S. Dennison
Ignition and Combustion of Diesel Fuels, by G. D. Boerlage and J. J. Broeze
Oil Engine Electric Generating Station Operating Costs, by Geo. C. Eaton

Boiler Feedwater Session

The Use of Solubility Data To Control the Deposition of Sodium Sulphate or Its Complex Salts in Boiler Water, by W. C. Schroeder, A. A. Berk and E. Partridge

Estimation of Dissolved Solids in Boiler Water by Density Readings, by J. A. Holmes and J. K. Rummel

Suspended Solids in Foaming and Priming of Boiler Water, by C. W. Foulk

Effect of Solutions on Endurance of Low Carbon Steel Under Repeated Torsion at 482 deg. F. (250 deg. C.), by W. C. Schroeder and Everett P. Partridge

Embrittlement of Boiler Steel by Caustic Soda, by G. H. Wagner and J. R. Wall

Study of Effect of Concentrated Sodium Hydroxide on Boiler Steel Under Tension, by A. S. Perry

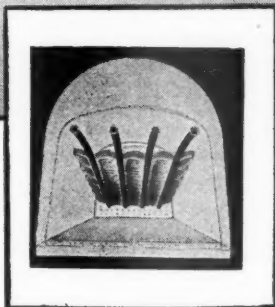
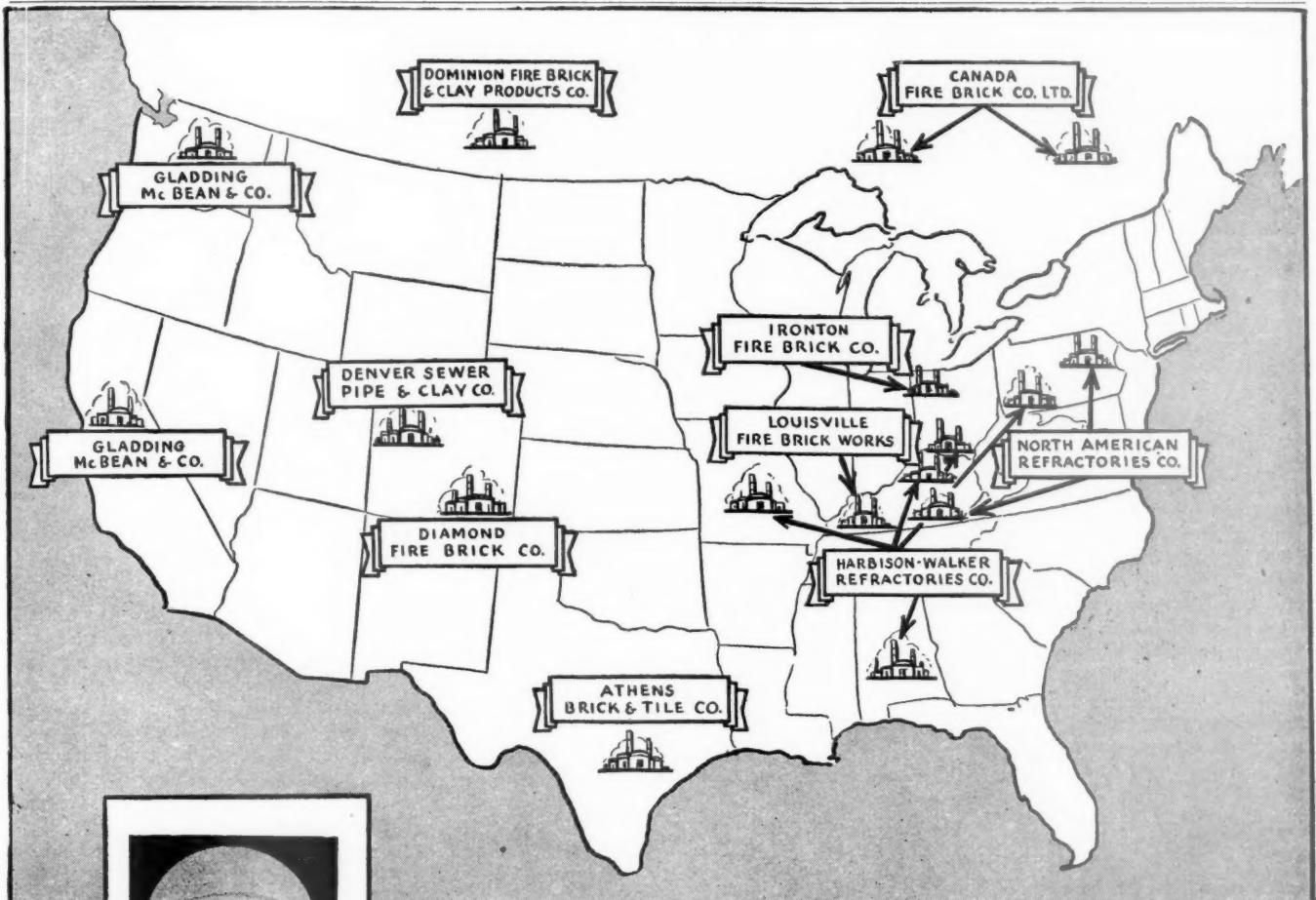
Radiation from Non-Luminous Flames, by H. C. Hottel and V. C. Smith.

New Plan of Depreciation Accounting Proposed for Pullman Company

Examiner A. M. Bunten of the Interstate Commerce Commission has submitted to the commission a proposed report recommending that the commission prescribe a plan of depreciation accounting for sleeping-car companies subject to the interstate commerce act to become effective on

Continued on next left-hand page

TO AID IN FACILITATING RAILROAD OPERATION



*There's More to
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The importance of avoiding the need for holding locomotives out of service cannot be overestimated.

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These supply sources, as indicated on the map above, are so located as to care adequately for all railroads.

AMERICAN ARCH COMPANY
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Locomotive Combustion Specialists
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January 1, 1937, under the provisions of Section 20(5) of the act. The proceeding is supplemental to that in which the commission has heretofore prescribed depreciation accounting for the railroads and telephone companies and the report states that the same fundamental principles are controlling. The Pullman Company, which is the only sleeping-car company subject to the act, has long maintained a system of depreciation accounting and at the end of 1933 had a balance of \$136,504,918, or 58.26 per cent of its investment in sleeping car property, in its depreciation reserves. Equipment represented 94.79 per cent of the total investment. Uniform annual rates upon the straight line basis are used and in general the unit method has been applied.

The chief interest of the company in the proceeding, the report says, concerns the proposed change from the unit method to the group method, and a large part of the report is devoted to a discussion of the company's objections to the group method. The proposed findings recommend that depreciation charges be included under operating expenses for four plant accounts and seven equipment accounts and that the group method as distinguished from the unit method shall be adopted. Under the group method depreciation charges are computed upon the ledger value of all property included in each depreciable account, using the average service life thereof properly weighted, and upon the retirement of any depreciable property its full service value is charged to the depreciation reserve whether or not the particular item has attained the average service life. The report says that since this method has been adopted for other classes of carriers it should also be adopted for sleeping car companies and that no special or unusual circumstances have been shown sufficient to justify an exception.

Depreciation charges constitute from 15 to 20 per cent of the Pullman Company's operating expenses and taxes and it has reserved an amount equal to 5 per cent of the investment for each car for every year to 19.5 years since it was put into Pullman service.

Exhibit of Bridge and Building Materials

Thirty-three manufacturers of materials and equipment entering into the construction and maintenance of railway bridge, building and water service facilities joined in the exhibit of their products at the forty-second annual convention of the American Railway Bridge and Building Association at the Hotel Stevens, Chicago, on October 15-17. The exhibit was more than usually instructive and educational in character by reason of the display of materials rather than photographs and literature. It was also arranged effectively in the Tower room of the hotel.

The officers who directed the affairs of the Bridge and Building Supply Men's Association during the past year and who planned the exhibit were: President, B. S. Spaulding, Fairbanks, Morse & Company, Chicago; vice-president, J. W. Shoop, manager railroad sales, Lehon Company, Chicago; secretary, L. F. Flan-

agan, Detroit Graphite Company, Chicago; treasurer, B. J. Wilson, Pocket List of Railroad Officials; directors, W. S. Carlisle, National Lead Company, Chicago; J. H. Bracken, Celotex Company, Chicago; C. H. Johnson, Fairmont Railway Motors, Inc., Fairmont, Minn.; A. J. Filkins, Paul Dickinson, Inc., Chicago; T. G. Windes, National Aluminate Corporation, Chicago; George R. McVay, Ruberoid Company, Chicago, and S. A. Baber, honorary director.

At the annual election on Thursday morning, the following officers were chosen for the ensuing year: President, J. W. Shoop; vice-president, L. F. Flanagan; secretary, W. S. Carlisle; treasurer, D. A. Hultgren, sales manager, Massey Concrete Products Company, Chicago; directors, G. C. Mills, Zitterell Mills Company, Webster City, Iowa; Earl Mann, E. A. Mann Associates, Chicago, and K. T. Batchelder, manager railroad sales, Insulite Company, Chicago.

The names of the companies participating in the exhibit, together with the names of their representatives and the nature of their exhibit, follow:

Arrow Tools, Inc., Chicago; forged tools, safety retainers, riveting hammers; H. J. Trueblood and N. W. Benedict.
Barrett Company, New York; rolled roofing, paint, roofing cement; M. J. Rotroff.
Binks Manufacturing Company, Chicago; paint spray equipment; J. E. Schabo.
Celotex Company, Chicago; wallboard, hard tile and insulation, rock wool, vapor proof low tension insulation; D. J. Carmouche, H. A. Winandy, J. H. Bracken and C. W. Young.
Dearborn Chemical Company, Chicago; rust preventives; E. M. Converse, A. C. Moeller, C. C. Rausch and J. A. Crenner.
Detroit Graphite Company, Detroit, Mich.; literature on rust prevention and paints, and samples of paint colors; Luke F. Flanagan and J. R. C. Hintz.
Paul Dickinson, Inc., Chicago; smokejacks, cast iron chimneys, drain heads and ventilators; A. J. Filkins.
Joseph Dixon Crucible Company, Jersey City, N. J.; paints, graphites and graphite products; E. C. Bleam.
Duff-Norton Manufacturing Company, Pittsburgh, Pa.; bridge and building jacks; C. N. Thulin and E. E. Thulin.
Fairbanks Morse & Company, Chicago; catalogs on pumps, turbines, Diesel engines, standpipes, electric motors and motor cars; E. C. Golladay, E. F. Kultchar, W. L. Nies, B. S. Spaulding and C. H. Wilson.
Fairmont Railway Motors, Inc., Fairmont, Minn.; literature on motor cars and work equipment; C. P. Benning, Kenneth Cavins, Arthur Fletcher and C. H. Johnson.
Ingot Iron Railway Products Company, Middletown, Ohio; multiplate pipe and paved invert pipe; W. R. Greenawalt, J. L. Young and J. R. Wilks.
Insulite Company, Minneapolis, Minn.; samples of insulation, K. T. Batchelder, C. W. Hansen and C. S. Johnston.
Johns-Manville Sales Corporation, New York; samples of transite asbestos wood (flat and corrugated), asbestos roll roofing, standard asphalt bridge plank, mineral surfaced plank, built-up roofing and waterproofing, transite pipe, flooring materials; C. S. Clingman and T. O'Leary, Jr.
Koppers Products Company, Pittsburgh, Pa.; built-up roofing, waterproofing materials; S. J. Katz and H. L. Stockdale.
Lehon Company, Chicago; aluminum paint, insulating paper, asbestos shingles and asphalt roof coating; Tom Lehon and J. W. Shoop.
Mall Tool Company, Chicago; concrete vibrating and rubbing equipment, sump pump, portable saw, grinder, disc sander, wire scratch brush; F. A. McGonigle, Merle Elrick and A. W. Mall.
Earle A. Mann & Associates, Chicago; streamline pipe and fittings, copper pipe and fittings, valves and paint spray equipment; Earle A. Mann, A. A. Walker and W. F. We'er.
Massey Concrete Products Corporation, Chicago; literature and photographs of concrete highway crossings, culvert pipe, piling and cribbing; Ross Clarke and D. A. Hultgren.
National Lead Company, New York; structural paints and anchoring specialties; W. S. Carlisle, F. M. Hartley, Otto Meyer and A. H. Sabin.
George P. Nichols & Bro., Inc., Chicago; unit assembly of controller with resistance and switch

cabinet, photographs of turntable tractors; S. F. Nichols, B. F. Goldman and G. M. Shearer.
Otley Paint Manufacturing Company, Chicago; pigments, paint panels, paint vehicles; E. Van Patten and W. A. Otley.

Oxweld Railroad Service Company, Chicago; cutting and welding torches, welding outfits with cylinders and regulators, paint burning outfit, welded specimens; Lem Adams, F. C. Teichen and D. H. Pittman.

Patterson-Sargent Company, Cleveland, Ohio; paints; George W. Anderson and W. H. McBride.

W. W. Patterson Company, Pittsburgh, Pa.; wood and steel tackle blocks; W. W. Patterson, Jr.

Pittsburgh Plate Glass Company, Newark, N. J.; paints and water-proofing; J. G. Mowry, J. E. Leonard, C. S. Gush and W. T. Carey.
Pocket List of Railroad Officials, New York; copies of publication; B. J. Wilson.

Railway Engineering and Maintenance, Chicago; copies of publication; Elmer T. Howson, H. A. Morrison, G. E. Boyd and M. H. Dick.

Ruberoid Company, New York; asbestos and asphalt shingles and roofing, asbestos pipe covering and insulating materials; T. N. Dantz and G. R. McVay.

Teleweld, Inc., Chicago; welded plate samples; C. W. McKee and A. M. Wood.

United States Gypsum Company, Chicago; paints, roofing, insulation and wallboard; F. C. Vandervort.

U. S. Wind Engine & Pump Company, Batavia, Ill.; samples of wood tanks, steel towers, float valves, windmills and Curtis pumps, and literature on tank fixtures and water columns; C. E. Ward.

Zitterell Mills Company, Webster City, Iowa; G. C. Mills.

Construction

NATIONAL RAILWAYS OF MEXICO.—This company is contemplating the construction of a new passenger terminal in Mexico, D. F., on the site of the present Buenavista station, in which would be concentrated all passenger services offered by the Colonia and Interceanic stations. It is expected that the new station will include enlarged office space, thus permitting the present railroad offices, which are now scattered at various points throughout the city, to be consolidated under one roof. It is estimated that the new structure will cost between two to three million pesos.

It is also planned to reconstruct the station building and water plant at San Luis, Tlax, while the reconstruction of the station at Tampico, Tamp., is now well under way. The erection of a new station building at Dona Cecilia, Tamp., is to be undertaken immediately after the Tampico station is completed. This railroad is also studying the advisability of electrifying its water service plants at Cardenas, S. L. P., and other points.

This company is studying a project for the reconstruction and relocation of portions of its Matamoros branch where floods from the Rio Grande river have caused considerable damage at various times. Last year alone train service was interrupted by floods on 28 days. It is estimated that the project now under consideration on this branch will cost about 1,000,000 pesos.

STATEN ISLAND RAPID TRANSIT.—This Baltimore & Ohio subsidiary has given a contract to the Faircroft Engineering Corporation, Brooklyn, N. Y., for grading, masonry and other heavy construction work in connection with the elimination of grade crossings on the Stapleton-Tompkinsville section of this road, Staten Island, N. Y.

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THE SUPERHEATER COMPANY

NEW YORK



CHICAGO

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An Effective Feed Water Heater
SIMPLE • RELIABLE • ECONOMICAL



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THROUGHOUT THE WORLD

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MONTREAL
The Superheater Co., Ltd.
Dominion Square Bldg.

CHICAGO
Peoples Gas Bldg.

Supply Trade

Handlan, Inc., St. Louis, Mo., has been appointed sales representative of the **Track Specialties Company**, New York, for the southwest and the Chicago territory.

F. C. Brandt of the Chicago office of the **Babcock & Wilcox Company**, New York, is now in charge of a new sales office to serve the eastern half of Missouri and the southern section of Illinois, which the company has opened at 1809 Railway Exchange building, St. Louis, Mo.

The Worthington Pump & Machinery Corporation, Harrison, N. J., has authorized the construction of an additional machine shop building at its Buffalo, N. Y., works, this extension to cover a floor area of 75,000 sq. ft. It is expected that the building will be ready for occupancy about the first of the coming year.

Muscoe Burnett, Jr., formerly assistant division manager of the **Linde Air Products Company**, with headquarters at Chicago, has been appointed assistant sales manager of the **Oxweld Railroad Service Company**, with the same headquarters. He was born in Paducah, Ky., and was educated at the University of Virginia. Since leaving college in 1920, he has been associated continuously with various units of the **Union Carbide & Carbon Corporation**, of which the **Oxweld Railroad Service Company** is one. His first connection in 1920 was with the **Oxweld**



Muscoe Burnett, Jr.

Acetylene Company. Four years later he was transferred to the export department of the **Union Carbide Company**, later going to the **Linde Air Products Company**, where since 1929 he has been assistant division manager at Chicago.

OBITUARY

Frank A. Hatch, president of **Shepard Niles Crane & Hoist Corporation**, Montour Falls, N. Y., died at his home in Montour Falls on October 15. Mr. Hatch was born in November, 1877, at Bay City, Mich., and was graduated from the University of Michigan in 1900. Three years

later he served as treasurer of the **Pneumatic Tool Company** at Montour Falls, in 1917 becoming vice-president and general manager of its successor, the **Shepard Electric Crane & Hoist Company**. In 1929 he was elected president and a member of the executive committee of the **Shepard Niles Crane & Hoist Corporation**. He was also a director of the **Niles-Bement-Pond Company**, New York.

Charles W. Kelly, secretary-treasurer of the **National Railway Appliances Association**, Chicago, died in that city on October 19, following an operation for the



Charles W. Kelly

removal of gall stones. He was born in Sullivan, Ind., on August 5, 1870, and after graduating from **Purdue University** in 1891 with the degree of civil engineer, was associated with the **World's Columbian Exposition**. In 1893, he entered the employ of the **Chicago & North Western** as a draftsman and after holding various positions was appointed superintendent of bridges and buildings in 1901. He held the latter position until 1907, when he resigned to become a representative of the railroad department of **Fairbanks, Morse & Co.**, where he was later promoted to assistant sales manager. In 1912, he resigned to organize the **Kelly-Derby Company** with which company he continued as president until his retirement in 1925. In 1909, he was elected secretary-treasurer of the **National Railway Appliances Association**, which position he was holding at the time of his death.

TRADE PUBLICATION

THE OSMOSE PROCESS.—The **Osmose Corporation of America**, Buffalo, N. Y., has published an eight-page booklet entitled "The Osmose Process for the Preservation of Standing Poles and Piling," which explains how the use-life of poles and piling may be increased by the **Osmose process** of wood preservation. The booklet also explains the purposes and functions of the various treating compounds used in the **Osmose process** and describes how the preservatives penetrate the wood by means of the process of osmosis. Another feature of the booklet is a series of illustrations showing how the **Osmose compounds** are applied in the treatment of standing poles and piles.

Equipment and Supplies

LOCOMOTIVES

THE LEHIGH & NEW ENGLAND contemplates buying one 0-6-0 type switching locomotive.

THE UNITED STATES NAVY DEPARTMENT, BUREAU OF SUPPLIES AND ACCOUNTS, Washington, D. C., will open bids on November 8 for one standard gage locomotive (about 25 tons), powered with a heavy-duty gasoline engine for delivery at Santiago, Calif.

FREIGHT CARS

THE READING is building 100 automobile box car bodies of 50 tons' capacity in its shops at Reading, Pa.

PASSENGER CARS

THE CANADIAN PACIFIC has given an order to the **National Steel Car Company**, Hamilton, Ont., for the frames of eight steel coaches 65 ft. long and of four combination baggage and buffet cars. Orders were also given to the same builder for four complete steel mail and express cars. The interiors of the coaches and combination baggage and buffet cars will be finished at the road's Angus shops, Montreal.

IRON AND STEEL

THE CHICAGO & NORTHWESTERN has ordered 2,400 tons of rails from the **Carnegie-Illinois Steel Company**.

SIGNALING

THE ST. LOUIS-SAN FRANCISCO has ordered from the **Union Switch & Signal Company** material for the installation of automatic block signals on its line between Memphis, Tenn., and New Albany, Miss. The order includes 113 three-position semaphore signals with the necessary instruments, mechanism cases, etc.

AIR CONDITIONING

THE NORFOLK & WESTERN will air condition 25 additional passenger cars at its Roanoke, Va., shops.

MISCELLANEOUS

THE PENNSYLVANIA has awarded a contract to the **Otis Elevator Company** for the installation in **Pennsylvania Station**, New York, of five new escalators, four of which will replace existing stairways between each of four track platforms and the exit concourse level; a fifth will be installed between the exit concourse level and the main concourse level. The new escalators, all of the reversible type, will be 3 ft. wide, with rises varying from 10 to 14 ft., and each will have a capacity of 6,000 persons an hour. They are to cost about \$150,000 and are to be in service in December.

Continued on next left-hand page

TO ECONOMIZE: MODERNIZE



AMERICAN LOCOMOTIVE COMPANY

AS of January 1, 1935, 35,011 locomotives, or 75.6 per cent of the locomotive inventory, were over 16 years old . . . Practically all these locomotives were built in the days when a division was 150 to 200 miles. In passenger service 5000 miles a month was a very desirable figure. Freight locomotives went out of service for a general overhauling in 50,000 miles or less, and passenger locomotives in about 75,000 miles. . . Today we have modern freight locomotives making 10,000 miles a month, and running 150,000 miles and more between shopping. Modern passenger locomotives run divisions of from 400 to 700 miles; make as high as 15,000 to 20,000 miles in a single month; and some have gone over 300,000 miles before a general shopping. These savings are all over and above the increased ton-miles per hour delivered at practically the same operating costs. . . Modern locomotives give utilization of power little dreamed of when over 75 per cent of the present locomotive inventory was built.

30 CHURCH STREET NEW YORK N.Y.



Financial

APPALACHIAN.—Abandonment.—The Interstate Commerce Commission has authorized this company to abandon as to interstate and foreign commerce its line extending from Ela, N. C., to Ravensford, 10 miles.

BALTIMORE & OHIO.—Abandonment.—This company and the Buffalo & Susquehanna have applied to the Interstate Commerce Commission for authority to abandon a line from Austin, Pa., to Keating Summit, 7.66 miles.

BALTIMORE & OHIO.—Extension.—The Interstate Commerce Commission has authorized the Baltimore & Ohio to extend its line from a connection with its main line at Fort George G. Meade Junction, Md., to Odenton, 5.8 miles, the extension to be accomplished by purchase of a line formerly owned by the Washington, Baltimore & Annapolis at a purchase price of approximately \$30,000.

BARTLETT WESTERN.—Abandonment.—The Interstate Commerce Commission has authorized this company to abandon as to interstate and foreign commerce its line extending from Bartlett, Tex., to Florence, 23.2 miles.

CAMBRIA & INDIANA.—Bonds.—The Interstate Commerce Commission has authorized an issue of \$1,300,000 of first mortgage serial bonds at 3½ per cent, to be sold at not less than their face value and the proceeds used, together with treasury funds, to redeem \$1,800,000 of outstanding bonds.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC.—Trustees appointed.—Henry A. Scandrett, president; Walter J. Cummings, president of the Continental Illinois National Bank & Trust Company, Chicago; and George I. Haight, an attorney, were appointed trustees of the Milwaukee by Federal Judge James H. Wilkerson at Chicago on October 17. In appointing three trustees, Judge Wilkerson took action differing from that of Judge John P. Barnes who, on October 1, named Charles P. Megan, an attorney, sole trustee for the Chicago & North Western. Judge Barnes said he was naming only one trustee because he believed one man could operate more economically and efficiently than several. Judge Wilkerson took a different view, saying, "It is to be borne in mind that the trustees take the place of a board of directors in the management of the road. I am obliged to say that I do not know of any one upon whom I would be willing to place the sole responsibility for the control of so large a railroad system. The injury which might come from the inexperience or unwise acts of one person clothed with sole authority and unchecked by the suggestion or advice of others, who likewise have responsibility to the court, outweighs, in my opinion, the objection of a divided responsibility."

"Personally, I have found the administration of three trustees most satisfactory in the Rock Island case, and I am sure that is the opinion of the parties in interest in

that case. All three trustees have earnestly devoted their energies and abilities to the solution of the difficult problems confronting them."

CHICAGO, ROCK ISLAND & PACIFIC.—Abandonment.—The trustees have applied to the Interstate Commerce Commission for authority to abandon the line from Ingersoll, Okla., to Anthony, Kan., 32.8 miles.

EAST WASHINGTON.—Acquisition.—This company, recently incorporated in Maryland, has applied to the Interstate Commerce Commission for authority to acquire and operate a section of the Chesapeake Beach Railway, recently abandoned, from Seat Pleasant, Md., to Chesapeake Junction, D. C., 2.9 miles.

ERIE.—R.F.C. Loan.—Finding that the company is not in need of financial reorganization at this time the Interstate Commerce Commission has approved a three-year extension of this company's loans from the Reconstruction Finance Corporation amounting to \$12,119,000 maturing on various dates to January 3, 1936. The collateral now pledged as security for the loans was found to constitute full and adequate security.

GULF, MOBILE & NORTHERN.—P.W.A. Loan.—The Interstate Commerce Commission has approved a loan of \$300,000 by the Public Works Administration to this company to cover cost of maintenance work, including relaying of 30 miles of the New Orleans Great Northern with 90-lb. rail, together with necessary track fastenings, ties and ballast.

KANAWHA & MICHIGAN.—Acquisition.—This company, whose property is operated by the New York Central, has applied to the Interstate Commerce Commission for authority to acquire the property of the Kanawha & West Virginia, whose stock it owns, and to assume obligation and liability in respect of its \$2,067,000 fifty-year 5 per cent bonds.

LEHIGH VALLEY.—R. F. C. Loan.—The Interstate Commerce Commission has authorized the extension until January, 1938, of the time of payment of two loans of \$1,000,000 from the Reconstruction Finance Corporation to this company, one maturing October 31 and the other November 28.

MINNEAPOLIS & ST. LOUIS.—Acquisition.—The Interstate Commerce Commission has issued an order authorizing the Board of Railroad Commissioners of the State of South Dakota, the Fort Dodge, Ia., Chamber of Commerce, the Commerce Association of Aberdeen, S. D., the Northwestern Lumbermen's Association, and the Northwestern Retail Coal Dealers' Association to intervene and be treated as parties to the proceedings on the application of the Associated Railways for authority to acquire the lines of the Minneapolis & St. Louis, to operate certain portions, and to abandon certain portions.

NEW YORK, ONTARIO & WESTERN.—Guarantees Note.—The Interstate Commerce Commission has authorized this

company to assume liability as guarantor of a note for \$650,000 of the Scranton Coal Company to the Reconstruction Finance Corporation.

Average Prices of Stocks and of Bonds

	Oct. 22	Last week	Last year
Average price of 20 representative railway stocks...	35.54	35.09	35.24
Average price of 20 representative railway bonds...	71.92	71.50	74.38

Dividends Declared

Allegheny & Western.—Guaranteed, \$3.00, semi-annually, payable January 2 to holders of record December 20.

Cayuga & Susquehanna.—\$1.20, semi-annually, payable January 2 to holders of record December 20.

Chestnut Hill.—75¢, quarterly, payable December 3 to holders of record November 20.

East Mahoning.—\$1.25, semi-annually, payable December 15 to holders of record December 5.

Kansas City, St. Louis & Chicago.—Preferred, \$1.50, quarterly, payable February 1 to holders of record January 17.

Norfolk & Western.—\$2.00, quarterly, payable December 19 to holders of record November 30.

Railway Officers

EXECUTIVE

Roberto Lopez has been appointed assistant executive president of the National Railways of Mexico, with headquarters at Mexico, D. F. Mr. Lopez will have comptroller's functions and will be in charge of financial matters.

George W. Lamb, general auditor of the Atlantic Coast Line, with headquarters at Wilmington, N. C., has been elected assistant to the chairman of the board of directors of the Louisville & Nashville, with headquarters at New York. Mr. Lamb was born on December 23, 1875, at Bellevue, Ky. He was educated in the



Blackstone Studios

George W. Lamb

public schools and entered railroad service in October, 1900, with the Louisville & Nashville, as a clerk in the office of the comptroller. Mr. Lamb was advanced through various clerical positions and in 1910 he was appointed statistician. In

Continued on next left-hand page



CAB SIGNALS HAVE PROVED THEIR VALUE

7,762 miles of track and 4,520 locomotives and motor cars are equipped for cab signaling in the United States. On every one of these track miles and locomotives these signals have proved their value. Verify this statement by consulting any of the users.

"Union" Coded Continuous Cab Signals have proved their value in many ways, wherever used:

1. They have increased safety of train operation.
2. They have enabled users to maintain schedules despite adverse weather conditions.
3. They have accelerated train speeds.
4. They have improved the relationship between the roads and the riders and shippers.
5. They have relieved the anxiety and increased the confidence of trainmen.
6. They have effected operating economies.

Our nearest district office will be glad to detail the many operating and economic features of this modern signal.

I. C. C. Bureau of Safety, 1935 report as of Jan. 1.

1881

Union Switch & Signal Co.

SWISSVALE, PA.

1017

NEW YORK

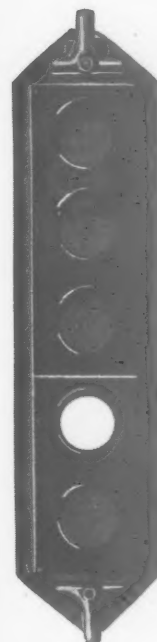
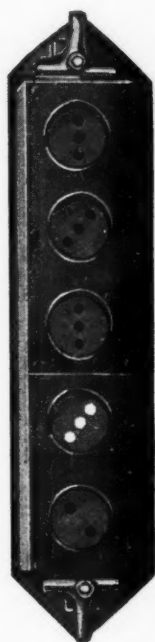
MONTREAL

CHICAGO

ST. LOUIS

SAN FRANCISCO

1935



1911 he was promoted to second assistant comptroller and in November, 1916, to the position of first assistant comptroller. During federal control he served as staff officer in charge of accounts, with headquarters at Atlanta, Ga., and when the railroads were returned to their owners he again entered the service of the Louisville & Nashville as senior assistant comptroller at Louisville, Ky. In March, 1921, he was selected as general auditor of the Express Contract Accounting Committee, of the Association of Railway Executives, with headquarters at New York. He organized bureaus at New York, Philadelphia, Pa., Chicago and Chattanooga, Tenn., for the purpose of checking the accounts of the American Railway Express Company on behalf of all the railroads operating under the uniform and amended uniform express contracts. He remained in this position until May 31, 1930, when he resigned to accept the position of general auditor of the Atlantic Coast Line.

OPERATING

T. Jackson, car accountant of the Denver & Salt Lake, has been appointed to the newly-created position of superintendent of car service, with headquarters as before at Denver, Colo.

Earle C. Webster, special representative of the executive vice-president of the Union Pacific System, has been appointed manager of the dining car and hotel department of the system, with headquarters as before at Omaha, Neb., succeeding **Frank E. Lewis**, who has retired, effective November 1.

TRAFFIC

M. S. Swanson has been appointed general agent of the Union Pacific System, with headquarters at Oakland, Cal., succeeding **James Warrack**, deceased.

PURCHASES AND STORES

Ernest M. Willis, executive assistant to the president of the Northern Pacific, who has been appointed purchasing agent



Ernest M. Willis

of that company, succeeding the late **C. C. Kyle**, as noted in the *Railway Age* of October 19, first entered the service of

this company in 1907 as a stenographer in the offices at St. Paul, Minn. Four years later Mr. Willis was advanced to chief clerk to the president, which position he held until August, 1913, when he left this road to become secretary to the chairman of the board of the New York, New Haven & Hartford, with headquarters at Boston, Mass. In March, 1916, he was appointed assistant to the president of this company and in August, 1918, he returned to the Northern Pacific as assistant secretary and assistant treasurer, with headquarters at New York. In March, 1925, Mr. Willis returned to St. Paul as executive assistant to the president, which position he continued to hold until his recent appointment as purchasing agent.

MECHANICAL

George William Rink, mechanical engineer of the Central of New Jersey at Elizabethport, N. J., has been appointed mechanical engineer of the Central of New Jersey and the Reading, with headquarters at Reading, Pa. Mr. Rink, who was born on September 4, 1875, at New York, is a graduate of Cooper Union, New York. He entered the employ of the Erie on May 14, 1892, serving until March, 1896, as a machinist apprentice, and until 1899 as a machinist and shop draftsman. During 1899-1900 he was a draftsman on the Northern Pacific. He then served (1900-01) as a draftsman on the Central of New Jersey, becoming enginehouse foreman and inspector of new equipment in 1901. During 1902-03 he was engaged in road testing of locomotives and as a draftsman. He was chief draftsman and instructor of apprentices from 1903 until 1909, when he was appointed mechanical engineer. From 1918 until 1929 he was assistant superintendent motive power, in charge also of engineering, at Jersey City, N. J. In 1929 he was appointed mechanical engineer at Elizabethport.

OBITUARY

Percy R. Todd, president of the Bangor & Aroostock, with headquarters at Bangor, Me., died in that city on October 23 after several weeks' illness. Mr. Todd was 75 years old.

Adam Johnson Poole, who retired in 1933 as mechanical assistant to the president of the Tennessee Central, died at Knoxville, Tenn., on October 4. Mr. Poole was born at Americus, Ga., 62 years ago. At the age of sixteen he entered railroad service as machinist apprentice with the Central of Georgia, at Macon, Ga. After completing his apprenticeship and, while working as a machinist he worked as an extra fireman and later went to the Seaboard Air Line as locomotive engineer, serving successively as general foreman at Americus, master mechanic, general master mechanic and superintendent of motive power. Later, leaving railroad service, Mr. Poole engaged in private business in Norfolk, Va., and in 1915 he went with the Galena-Signal Oil Company as one of their mechanical experts. He continued with this company until 1927, when he returned to railway service as mechanical assistant to the president of the Tennessee Central,

which position he held until his retirement on account of ill health.

William J. Werner, auditor of the International-Great Northern, with headquarters at Palestine, Tex., died in the company hospital at that point on October 20. Mr. Werner was born on May 31, 1876, in Walker county, Tex., and entered railway service in 1897 as a student clerk on the International-Great Northern, serving consecutively in this position and as station clerk, station cashier, and station agent until 1904. In that year Mr. Werner was promoted to traveling auditor, which position he held until September, 1909, when he was made chief traveling auditor. During the latter part of 1911 he served as chief clerk to the auditor, then being advanced to assistant auditor. In April, 1913, Mr. Werner was promoted to auditor, which position he held until his death, except during the period of federal control of the railroads when he served as federal auditor of this company.

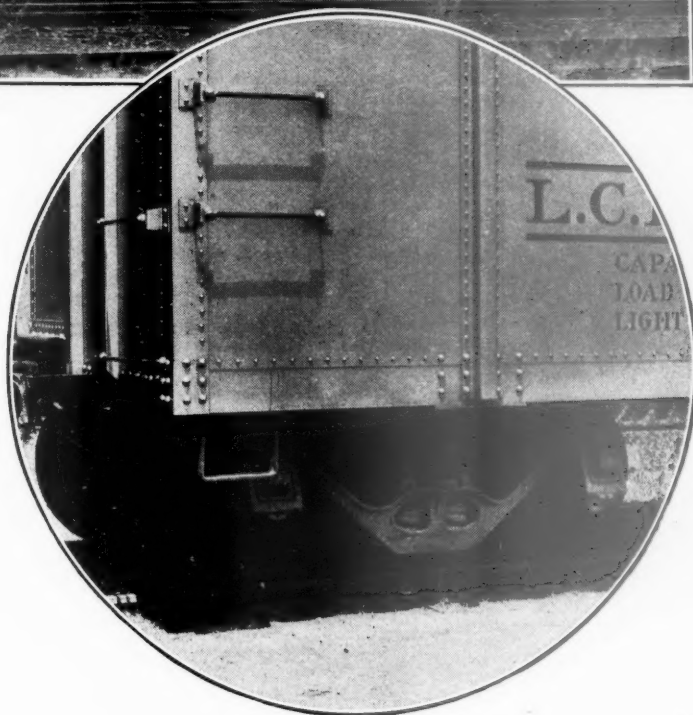
Thomas B. Montgomery, who resigned as eastern freight traffic manager of the Northern Pacific in April, 1934, on account of ill health, died on October 20 at the Hotel Barbizon-Plaza, New York. Mr. Montgomery was born on October 7, 1870, at Aylmer, Ont. After graduating from the Upper Canada College at Toronto, he entered railway service in January, 1889, as a clerk. In 1893 he became night agent of the Wagner Sleeping Car Company and the following year was appointed assistant district superintendent. When the Wagner Company was absorbed by the Pullman Company in January, 1900, he was appointed agent. In May, 1900, he became traveling freight agent for the Wisconsin Central, now a part of the Minneapolis, St. Paul & Sault Ste. Marie. Mr. Montgomery was promoted to New England agent in January, 1901, and in December, 1902, he became general agent, which position he held successively at Milwaukee, Wis., Pittsburgh, Pa., and Chicago, Ill. In March, 1912, he became general agent for the Chicago, Milwaukee & St. Paul at Pittsburgh and in April, 1915, he was promoted to assistant general freight agent at Minneapolis. Mr. Montgomery was promoted to general eastern agent at New York in December, 1916. He entered the service of the Northern Pacific in February, 1920, as general eastern agent at New York and was promoted to assistant freight traffic manager at St. Paul, in September, 1920; the following year he became general freight agent. In March, 1924, he was promoted to assistant freight traffic manager and was appointed general eastern agent at New York in November, 1926. Mr. Montgomery became eastern freight traffic manager in 1931.

THE SOCIETY OF OFFICERS, United Associations of Railroad Veterans, at its recent annual meeting in Cincinnati, elected as president for 1935-36, John Draney, Delaware, Lackawanna & Western; first vice-president, Luther Fritts, Central of New Jersey; second vice-president, D. L. Forsythe, Frisco Lines; secretary, M. W. Jones, Baltimore & Ohio, Baltimore, Md. It was voted to hold the convention next year at Detroit, Mich., in October.



National Type B Trucks

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Better results are obtained by the use of NATIONAL TYPE B (Springplankless) TRUCKS on cars hauling perishable goods and cars where special loading mechanism is used.

**QUICK WHEEL CHANGE
MINIMUM WHEEL FLANGE WEAR**

All-Coil and Coileaf Spring Suspensions are interchangeable in National Type B Trucks, without reduction of side clearance.

NATIONAL MALLEABLE AND STEEL CASTINGS CO.
General Office—Cleveland, O.

Sales Offices: New York, Philadelphia, Chicago, St. Louis, San Francisco
Works: Cleveland, Chicago, Indianapolis, Sharon, Pa., Melrose Park, Ill.

Freight Operating Statistics of Large Steam Railways—Selected Items for the Month of August,

Region, road, and year	Average miles of road operated	Train-miles	Locomotive-miles		Car-miles		Ton-miles (thousands)		Average number of locomotives on line					
			Principal and helper	Light	Loaded (thousands)	Per cent loaded	Gross Excluding locomotives and tenders	Net Revenue and non-revenue	Serviceable	Unserviceable	Per cent unserviceable	Stored		
New England Region:														
Boston & Albany.....	1935	373	117,130	120,676	7,581	2,937	70.1	149,483	51,307	60	36	37.4	20	
	1934	402	119,740	123,671	8,236	2,959	68.6	152,190	50,818	62	37	37.4	19	
Boston & Maine.....	1935	1,971	247,289	271,625	22,901	8,379	73.3	422,485	156,843	100	172	63.2	9	
	1934	2,016	252,228	278,339	25,290	8,254	69.2	439,208	162,379	115	159	58.0	16	
N. Y., New Hav. & Hartf.....	1935	2,050	307,505	375,843	18,702	10,059	67.8	522,440	189,032	186	112	37.4	11	
	1934	2,049	320,536	389,761	16,687	9,953	66.9	526,045	192,517	210	140	40.0	30	
Great Lakes Region:														
Delaware & Hudson.....	1935	835	183,659	240,538	26,631	6,123	67.2	355,912	161,904	243	27	10.1	163	
	1934	848	198,475	256,044	26,635	6,133	61.8	377,808	166,530	244	30	10.8	155	
Del., Lack. & Western.....	1935	992	310,818	343,415	43,246	9,993	68.0	555,390	208,819	154	88	36.4	43	
	1934	992	339,572	375,232	45,527	10,357	65.0	595,319	221,396	182	73	28.7	50	
Erie (incl. Chi. & Erie).....	1935	2,305	648,914	674,093	34,422	26,453	65.3	1,596,547	584,715	276	199	41.8	73	
	1934	2,304	642,203	665,843	56,233	26,713	63.0	1,632,413	586,659	330	159	32.6	99	
Grand Trunk Western.....	1935	1,007	202,068	203,666	1,253	5,140	62.7	308,933	108,558	71	71	50.1	..	
	1934	1,007	210,590	211,445	1,470	5,138	59.2	315,273	103,291	70	72	50.8	..	
Lehigh Valley.....	1935	1,332	323,952	339,540	32,761	10,126	67.1	609,831	242,535	150	164	52.2	14	
	1934	1,335	370,762	387,838	37,224	10,514	63.3	644,145	245,753	183	131	41.8	26	
New York Central.....	1935	10,919	2,304,765	2,410,699	133,386	75,720	62.2	4,741,293	1,964,659	862	656	43.2	170	
	1934	10,941	2,293,454	2,394,433	140,368	75,808	60.5	4,767,052	1,921,442	890	703	44.1	154	
N. Y., Chi. & St. Louis.....	1935	1,661	411,318	414,894	5,359	14,066	64.8	825,048	306,917	138	42	23.1	50	
	1934	1,661	454,327	457,929	4,100	14,180	61.5	829,668	285,738	126	45	26.1	28	
Pere Marquette.....	1935	2,096	311,213	324,266	3,586	7,660	62.9	479,268	188,418	106	47	30.8	6	
	1934	2,108	305,474	313,443	2,409	7,214	59.6	458,757	171,833	109	41	27.2	15	
Pittsburgh & Lake Erie.....	1935	234	71,236	72,878	26	3,009	61.0	259,700	149,509	33	39	54.6	7	
	1934	234	66,913	68,561	..	2,734	58.2	235,970	131,715	31	41	56.9	6	
Wabash.....	1935	2,435	505,165	512,513	10,984	15,756	65.5	896,169	306,040	158	169	51.8	38	
	1934	2,445	515,975	521,848	10,616	15,463	64.1	883,046	291,618	164	164	49.9	38	
Central Eastern Region:														
Baltimore & Ohio.....	1935	6,319	1,266,095	1,537,687	157,547	37,918	64.0	2,502,302	1,114,921	713	602	45.8	135	
	1934	6,263	1,306,798	1,554,085	173,440	38,106	60.2	2,579,793	1,122,451	790	533	40.3	191	
Central of New Jersey.....	1935	684	132,382	142,247	23,868	4,131	61.9	270,461	123,354	71	85	54.5	20	
	1934	690	132,931	148,801	25,354	4,175	57.9	287,425	130,014	81	91	53.1	26	
Chicago & Eastern Illinois.....	1935	939	160,378	160,888	2,405	3,530	68.9	208,435	91,246	53	56	51.7	8	
	1934	939	165,610	165,770	2,779	3,663	63.4	223,968	90,867	49	62	55.6	8	
Elgin, Joliet & Eastern.....	1935	434	81,815	82,935	680	1,966	62.0	148,130	73,775	56	31	35.2	4	
	1934	446	73,765	74,687	582	1,619	59.7	125,130	59,508	62	27	29.9	14	
Long Island.....	1935	393	26,801	27,410	13,751	1,900	50.1	14,706	5,386	30	22	42.6	3	
	1934	396	26,540	27,298	12,901	273	52.9	20,371	7,438	29	28	49.8	1	
Pennsylvania System.....	1935	10,009	2,439,215	2,731,932	279,877	88,050	65.6	5,647,534	2,537,158	1,323	1,116	45.8	275	
	1934	10,018	2,365,740	2,636,391	292,188	83,151	63.8	5,452,496	2,430,758	1,497	935	38.5	407	
Reading.....	1935	1,452	333,205	359,058	37,335	9,304	62.1	635,143	289,176	267	102	27.5	101	
	1934	1,454	360,245	390,807	40,367	9,905	58.6	708,922	326,224	275	103	27.3	102	
Pocahontas Region:														
Chesapeake & Ohio.....	1935	3,050	777,650	813,153	32,273	34,197	57.1	2,872,657	1,570,557	398	103	20.5	98	
	1934	3,076	836,917	878,540	33,112	35,359	54.9	2,967,068	1,565,428	438	122	21.8	122	
Norfolk & Western.....	1935	2,145	572,201	594,759	25,426	23,303	60.9	1,888,247	1,000,127	322	59	15.6	103	
	1934	2,162	568,401	591,125	24,884	22,215	58.0	1,836,250	939,112	388	38	9.0	152	
Southern Region:														
Atlantic Coast Line.....	1935	5,147	437,317	437,641	6,034	8,918	69.0	444,549	161,398	307	114	27.2	48	
	1934	5,145	457,793	458,846	5,758	9,190	64.6	473,524	162,317	315	133	29.7	84	
Central of Georgia.....	1935	1,886	211,866	212,308	3,335	4,777	72.4	245,971	94,948	96	46	32.2	..	
	1934	1,886	218,476	221,421	3,633	4,753	67.4	253,482	92,507	100	41	28.9	..	
Illinois Central (incl. Y. & M. V.).....	1935	6,587	1,351,750	1,359,259	25,222	32,262	63.3	2,031,202	829,225	627	229	26.7	47	
	1934	6,616	1,371,127	1,385,443	26,260	32,594	59.8	2,104,171	819,599	561	341	37.8	21	
Louisville & Nashville.....	1935	5,045	889,812	961,847	22,639	20,802	62.5	1,426,223	699,000	300	281	48.3	29	
	1934	5,060	921,354	991,475	20,476	20,311	59.7	1,371,947	631,801	323	304	48.5	35	
Seaboard Air Line.....	1935	4,295	381,838	385,738	2,839	8,907	69.6	479,667	181,541	173	110	38.9	23	
	1934	4,296	442,697	450,714	4,220	9,876	64.0	554,710	199,919	195	81	29.4	22	
Southern.....	1935	6,599	1,068,859	1,083,356	17,820	24,966	70.1	1,316,233	508,393	525	288	35.4	59	
	1934	6,599	1,074,511	1,088,477	16,126	24,196	66.6	1,286,462	463,458	589	260	30.6	77	
Northwestern Region:														
Chi. & North Western.....	1935	8,428	936,144	980,477	25,956	24,941	64.1	1,532,445	547,644	554	207	27.3	115	
	1934	8,443	1,044,955	1,111,624	26,616	27,494	61.1	1,638,287	577,458	596	224	27.3	163	
Chicago Great Western.....	1935	1,458	224,282	224,992	6,855	6,776	62.0	411,716	147,965	62	32	33.9	6	
	1934	1,463	255,025	255,701	11,393	7,773	59.9	480,728	166,490	63	35	35.4	5	
Chi., Milw., St. P. & Pac.....	1935	11,119	1,300,028	1,373,014	60,434	35,309	62.5	2,199,390	891,725	509	153	23.1	108	
	1934	11,154	1,355,990	1,436,119	65,590	35,554	59.7	2,207,906	834,843	533	341	39.0	129	
Chi., St. P., Minneap. & Om.....	1935	1,641	215,753	221,297	9,168	4,867	67.5	291,348	121,868	107	34	23.9	42	
	1934	1,653	237,003	250,998	11,808	5,174	65.6	301,378	107,494	119	40	24.9	48	
Great Northern.....	1935	8,244	827,674	834,152	23,134	27,951	57.8	1,964,036	865,646	417	183	30.5	57	
	1934	8,302	801,950	808,048	23,552	26,049	59.9	1,720,495	738,581	424	165	28.0	82	
Minneap., St. P. & S. St. M.....	1935	4,273	353,405	358,804	3,054	8,054	64.1	473,760	196,883	122	29	19.4	..	
	1934	4,280	356,070	362,597	3,212	7,953	61.0	464,057	179,142	121	39	24.7	1	
Northern Pacific.....	1935	6,421	651,494	724,168	50,901	20,308	62.4	1,266,223	504,718	333	115	25.7	7	
	1934	6,410	757,422	828,249	55,165	22,961	59.6	1,450,422	530,619	355	110	23.6	17	
Oreg.-Wash. R. R. & Nav.....	1935	2,105	202,271	213,389	15,971	5,219	65.4	322,770	130,146	92	40	30.6	12	
	1934	2,150	192,199	200,371	13,310	4,795	65.6	284,712	108,694	90	39	29.9	15	
Central Western Region:														
Alton.....	1935	921	202,993	214,178	1,879	4,418	60.2	285,517	113,910	53	41	43.3	..	
	1934	921												

1935, Compared with August, 1934, for Roads with Annual Operating Revenues Above \$25,000,000

Region, road, and year	Average number of freight cars on line			Per cent un-service-able	Gross ton-miles per train-hour, excluding locomotives and tenders		Net ton-miles per train-mile	Net ton-miles per loaded car-mile	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotives and tenders	Locomotive-miles per locomotive-day
	Home	Foreign	Total		Gross ton-miles per train-hour, excluding locomotives and tenders	Gross ton-miles per train-mile, excluding locomotives and tenders							
New England Region:													
Boston & Albany.....1935	2,794	3,976	6,770	25.9	21,282	1,276	438	17.5	244	20.0	4,435	149	43.2
1934	3,018	3,371	6,389	25.7	21,384	1,271	424	17.2	257	21.8	4,081	150	42.7
Boston & Maine.....1935	8,461	6,546	15,007	15.6	23,326	1,708	634	18.7	337	24.6	2,567	101	34.9
1934	8,804	5,492	14,296	15.2	24,345	1,741	644	19.7	366	26.9	2,599	102	35.7
N. Y., New Hav. & Hartf..1935	14,904	10,064	24,968	17.3	24,251	1,699	615	18.8	244	19.2	2,975	101	42.7
1934	16,131	8,873	25,004	12.7	24,278	1,641	601	19.3	248	19.2	3,031	103	37.5
Great Lakes Region:													
Delaware & Hudson.....1935	11,590	2,328	13,918	3.9	26,290	1,938	882	26.4	375	21.1	6,252	107	31.9
1934	11,908	2,181	14,089	4.2	26,437	1,904	839	27.2	381	22.7	6,333	106	33.3
Del., Lack. & Western....1935	16,521	4,934	21,455	12.4	29,470	1,787	672	20.9	314	22.1	6,791	130	51.6
1934	16,901	3,849	20,750	11.6	27,197	1,753	652	21.4	344	24.8	7,200	137	53.1
Erie (incl. Chi. & Erie)...1935	21,970	11,667	33,637	5.7	41,531	2,460	901	22.1	561	38.9	8,183	89	48.1
1934	25,774	13,080	38,854	6.5	41,236	2,542	914	22.0	487	35.2	8,214	91	47.6
Grand Trunk Western....1935	4,994	5,929	10,923	20.2	29,208	1,529	537	21.1	321	24.2	3,479	97	46.5
1934	4,882	6,086	10,968	15.2	28,774	1,497	490	20.1	304	25.5	3,310	100	48.4
Lehigh Valley.....1935	14,212	5,998	20,210	9.0	34,185	1,882	749	24.0	387	24.1	5,872	120	38.3
1934	18,329	4,996	23,325	14.6	30,881	1,737	663	23.4	340	23.0	5,939	131	43.7
New York Central.....1935	123,164	61,003	184,167	19.8	34,418	2,057	852	25.9	344	21.3	5,804	96	54.1
1934	139,551	53,219	192,770	19.5	34,705	2,079	838	25.3	322	21.0	5,665	99	51.3
N. Y., Chi. & St. Louis....1935	7,845	7,338	15,183	5.3	35,564	2,006	746	21.8	652	46.1	5,962	83	75.5
1934	8,810	6,026	14,836	5.3	32,685	1,826	629	20.2	621	50.1	5,550	93	87.3
Pere Marquette.....1935	10,197	5,073	15,270	4.3	25,241	1,540	605	24.6	398	25.7	2,900	85	69.1
1934	11,575	4,365	15,940	3.6	25,183	1,502	563	23.8	348	24.5	2,630	89	68.0
Pittsburgh & Lake Erie....1935	15,397	12,052	27,449	47.0	51,836	3,646	2,099	49.7	176	5.8	20,639	86	32.5
1934	16,069	9,969	26,038	45.1	50,089	3,527	1,968	48.2	163	5.8	18,182	89	30.4
Wabash1935	13,015	8,297	21,312	2.8	34,649	1,774	606	19.4	463	36.4	4,055	102	51.6
1934	14,562	7,965	22,527	4.1	34,096	1,711	565	18.9	418	34.6	3,848	106	52.4
Central Eastern Region:													
Baltimore & Ohio.....1935	74,129	20,414	94,543	19.7	25,902	1,976	881	29.4	380	20.2	5,692	137	41.6
1934	83,479	20,974	104,453	18.0	26,294	1,974	859	29.5	347	19.5	5,781	135	42.1
Central of New Jersey....1935	12,721	7,795	20,516	31.1	25,580	2,043	932	29.9	194	10.5	5,817	138	35.4
1934	16,855	6,560	23,415	35.4	26,688	2,162	978	31.1	179	9.9	6,079	136	32.7
Chicago & Eastern Illinois.1935	3,733	2,980	6,713	14.7	24,767	1,300	569	25.8	438	24.6	3,135	128	48.5
1934	4,172	2,489	6,661	13.5	23,944	1,352	549	24.8	440	28.0	3,122	119	48.9
Elgin, Joliet & Eastern....1935	7,657	2,958	10,615	6.6	17,283	1,811	902	37.5	224	9.6	5,482	110	31.0
1934	9,279	3,016	12,295	21.0	17,528	1,696	807	36.8	156	7.1	4,303	111	27.3
Long Island1935	774	2,467	3,241	4.2	4,729	549	201	28.3	54	3.8	442	354	25.7
1934	774	2,720	3,494	2.6	6,023	768	280	27.2	69	4.8	606	296	22.9
Pennsylvania System1935	237,678	53,000	290,678	16.0	32,211	2,315	1,040	28.8	282	14.9	8,177	113	39.8
1934	243,989	46,294	290,283	13.0	32,031	2,305	1,027	29.2	270	14.5	7,827	114	38.8
Reading1935	31,135	7,509	38,644	9.0	24,959	1,906	868	31.1	241	12.5	6,426	139	34.7
1934	35,269	7,043	42,312	9.6	24,704	1,968	906	32.9	249	12.9	7,239	148	36.8
Pocahontas Region:													
Chesapeake & Ohio.....1935	40,042	10,830	50,872	2.4	52,286	3,694	2,020	45.9	996	38.0	16,611	69	54.4
1934	41,314	11,212	52,526	2.2	50,368	3,545	1,870	44.3	961	39.6	16,416	71	52.5
Norfolk & Western.....1935	33,091	4,573	37,664	3.4	48,020	3,300	1,748	42.9	857	32.8	15,042	96	52.5
1934	36,170	4,028	40,198	2.8	47,235	3,231	1,652	42.3	754	30.7	14,009	97	46.6
Southern Region:													
Atlantic Coast Line.....1935	22,837	5,052	27,889	20.2	17,472	1,017	369	18.1	187	15.0	1,012	113	34.0
1934	26,512	4,137	30,649	23.0	17,601	1,034	355	17.7	171	15.0	1,018	114	33.5
Central of Georgia.....1935	5,584	2,458	8,042	22.6	21,034	1,161	448	19.9	381	26.5	1,624	120	49.0
1934	6,787	1,980	8,767	27.4	20,708	1,160	423	19.5	340	25.9	1,583	124	51.5
Illinois Central (incl. Y. & M. V.).....1935	42,496	17,804	60,300	35.1	25,314	1,503	613	25.7	444	27.3	4,061	120	52.2
1934	53,300	15,916	69,216	40.2	25,347	1,535	598	25.1	382	25.4	3,996	123	50.5
Louisville & Nashville....1935	39,738	7,244	46,982	29.0	24,861	1,603	786	33.6	480	22.9	4,470	123	54.6
1934	48,866	7,040	55,906	33.1	23,684	1,489	686	31.1	365	19.6	4,028	131	52.1
Seaboard Air Line.....1935	9,976	3,580	13,556	4.2	21,181	1,256	475	20.4	432	30.4	1,363	115	44.4
1934	11,530	3,829	15,359	6.7	20,766	1,253	452	20.2	420	32.4	1,501	117	53.2
Southern1935	25,431	15,030	40,461	14.6	20,898	1,231	476	20.4	405	28.4	2,485	140	43.7
1934	28,338	13,314	41,652	14.3	20,321	1,197	431	19.2	359	28.1	2,265	143	42.0
Northwestern Region:													
Chi. & North Western....1935	40,799	24,511	65,310	10.3	24,114	1,637	585	22.0	270	19.2	2,096	113	42.7
1934	43,419	20,072	63,491	12.7	24,028	1,568	553	21.0	293	22.9	2,206	115	44.7
Chicago Great Western....1935	1,957	3,660	5,617	2.1	33,917	1,836	660	21.8	850	62.8	3,273	119	79.5
1934	2,312	3,355	5,667	2.6	35,074	1,885	653	21.4	948	73.8	3,671	117	88.1
Chi., Milw., St. P. & Pac..1935	48,884	17,452	66,336	2.6	26,363	1,692	686	25.3	434	27.5	2,587	115	69.9
1934	56,593	15,989	72,582	5.7	25,595	1,628	616	23.5	371	26.5	2,414	114	55.4
Chi., St. P., Minneap. & Om.1935	2,281	7,510	9,791	9.7	18,682	1,350	565	25.0	402	23.8	2,395	103	52.6
1934	1,994	7,165	9,159	10.0	19,276	1,272	454	20.8	379	27.8	2,098	107	53.4
Great Northern1935	40,090	12,986	53,076	5.9	35,756	2,373	1,046	31.0	526	29.4	3,387	103	46.1
1934	41,906	11,936	53,842	7.7	31,768	2,145	921	28.4	443	26.1	2,870	107	45.6
Minneap., St. P. & S. St. M.1935	13,799	5,306	19,105	4.4	21,166	1,341	557	24.3	334	21.3	1,486	95	77.4
1934	16,131	3,261	19,392	4.4	20,653	1,301	502	22.5	298	21.7	1,350	97	73.8
Northern Pacific1935	31,861	6,481	38,342	11.9	29,713	1,944	775	24.9	425	27.4	2,535	137	55.8
1934	37,175	5,798	42,973	12.7	29,688	1,915	701	23.1	398	28.9	2,670	144	61.2
Oreg.-Wash. R. R. & Nav..1935	7,125	2,611	9,736	5.5	24,087	1,596	643	24.9	431	26.4	1,994	139	56.1
1934	8,118	2,579	10,697	4.7	22,992	1,481	566	22.7	328	22.1	1,630	130	53.3
Central Western Region:													
Alton1935	2,392	7,003	9,395	20.4	32,156	1,407	561	25.8	391	25.2	3,989	109	74.1
1934	3,252	6,970	10,222	22.5	29,100	1,412	478	21.6	314	24.7	3,479	109	78.1
Atch., Top. & S. Fe (incl. G.C. & S.F. & P. & S.F.)1935	72,072	11,021	83,										



"Swift of Foot was Hiawatha"

"So he journeyed westward, westward,
Left the fleetest deer behind him."

Yet his namesake goes more swiftly,
Goes with swifter pace and sure,
From the wind-swept lake-side city,
From the teeming, busy marts of men,
To the land of lovely Minnehaha,
Onward to the realm of Laughing Water.

"Strong of arm was Hiawatha,"
Stout of heart and firm his tread;
Stronger yet are metal sinews,
Surer too, o'er paths of steel,
Runs the new-born Hiawatha,
Running boldly, swiftly, surely.

[The Milwaukee's high speed train
"Hiawatha" is safeguarded with
Westinghouse Air Brakes—the No.
8-ET Equipment on locomotives
and the UC Equipment on cars.]

"Not for fame was Hiawatha's running,
But to benefit and serve his people."

WESTINGHOUSE AIR BRAKE CO.

General Office and Works:

WILMERDING, PENNA.